JAN 30 1945

ENGINEERING NEWS-RECORD

JANUARY 25, 1945

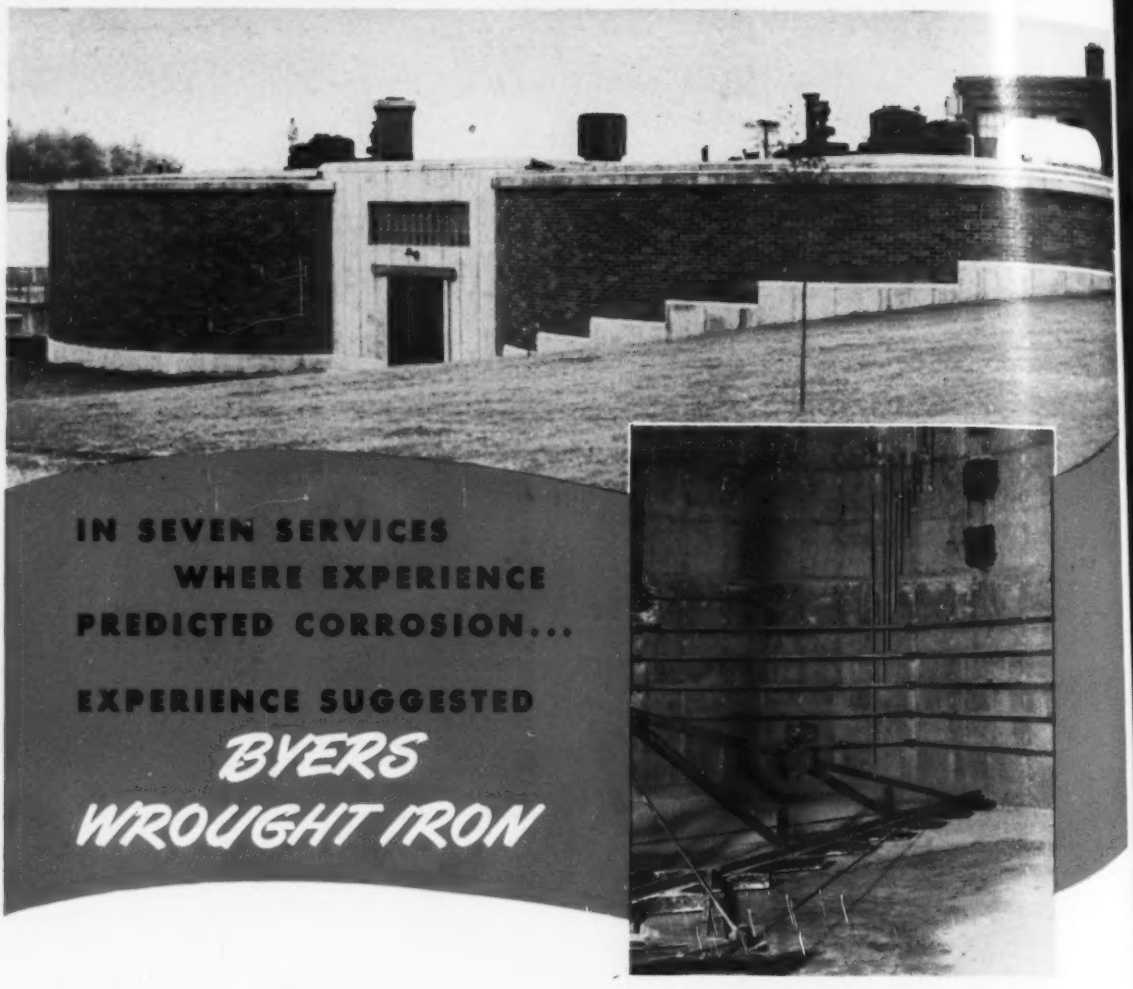
U. S. WAR CONSTRUCTION IN GREAT BRITAIN

By WALDO G. BOWMAN

A Report from the European Theatre of Operations

Featured Also

ERICAN WATER TREATY—A CONTROVERSIAL ISSUE



IN SEVEN SERVICES WHERE EXPERIENCE PREDICTED CORROSION...

EXPERIENCE SUGGESTED

BYERS WROUGHT IRON

Almost every new sewage treatment plant that comes along gives added evidence of some designer's insistence on durability—and of the reliance placed on wrought iron. In the recently completed addition and remodeling project in the town of Tonowanda, N.Y., Nussbaumer and Clarke, Inc., the engineers, specified wrought iron in six different services: heating coils for the sludge digester, waste soil and vent lines under 2-inches, hot and cold water piping in the buildings, and railings. This adds another to the impressive list of plants —new and old, large and small— where Byers Wrought Iron is helping to assure full utilization of facilities, and to reduce repairs and maintenance.

It is especially significant to find wrought iron so widely used in digester coils, which are recognized as among the most punishing services in the plant. The natural aggressiveness of the sewage is multiplied by the heating; some authorities have stated that the corrosion rate approximately doubles for each 20° rise in temperature. This service calls for something special in service qualities, and wrought iron is providing it.

The unusual structure of wrought iron is responsible for its unusual durability under highly corrosive sewage plant service. The body of high-purity iron is threaded with tiny fibers of glass-like silicate slag. When corrosive attack encounters these fibers it is halted and deflected, and the pitting that causes premature failure of ordinary materials is thus discouraged. Furthermore, the fibers help to anchor the initial protective scale, which shields the underlying metal just as a scab protects a wound.

Our Engineering Service Department will be glad to make recommendations—based on the reported experiences of other users —as to the places where wrought iron can be expected to serve you best. You will find some interesting and helpful information on a number of installations in our bulletin, "Wrought Iron for Sewage Treatment and Disposal Installations." May we send you a complimentary copy?

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Vol. 134 JANUARY 25, 1945 No. 4

COMING NEXT

• THE ANNUAL SURVEY and FORECAST NUMBER—more than 60 pages of text and illustrations—coming Feb. 8, will focus the spotlight on engineering and construction performance. Activities in all fields of the construction industry will be analyzed in relation to past and future accomplishments. Several authoritative articles on subjects of particular interest will be included. They are: Army Engineer Research Developments; Urban Rehabilitation Problems; What's Behind the Job of Local Postwar Planning, and Engineer Collective Bargaining—Rights and Wrongs. Featured also will be a twelve-page statistical section on construction volume; postwar planning progress; construction cost; labor rates; material prices trends, and construction employment.

LOOKING AHEAD

• A most difficult tunnel repair job was accomplished recently by an ingenious method without interfering with heavy wartime traffic on the B & O Railroad. From the crown drift driven on top of the old lining from a shaft sunk from the surface, the contractor cleared out a zone of broken and faulted rock, tore out the old arch lining and built a new concrete arch lining. Demolition and construction procedure will be described in the Feb. 22 issue.

• To meet wartime requirements, an industrial plant with an operating floor 120 ft. wide and with a clear height of 70 ft., was built recently on the Pacific Coast. The use of steel, due to its critical nature, was eliminated at the outset. To solve the problem, the designers used three-hinged arches of 120-ft. span with a rise of 72 ft. made of glued laminated timber built up into an I-beam or double channel section. Factors controlling the design of the arches and erection procedure will be outlined in a forthcoming issue.

• European engineers have made extensive progress in the practical application of artificially induced stresses in concrete structures beyond the stage of development in the U. S. The manner of prestressing differs considerably from current practice in this country. How the Europeans are handling the problem will be discussed in an early issue.

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Number of copies of this issue printed: 36,090

DO YOU WANT AN INDEX?

Due to the paper shortage, no index for volume No. 133 (July-December, 1944) will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below.

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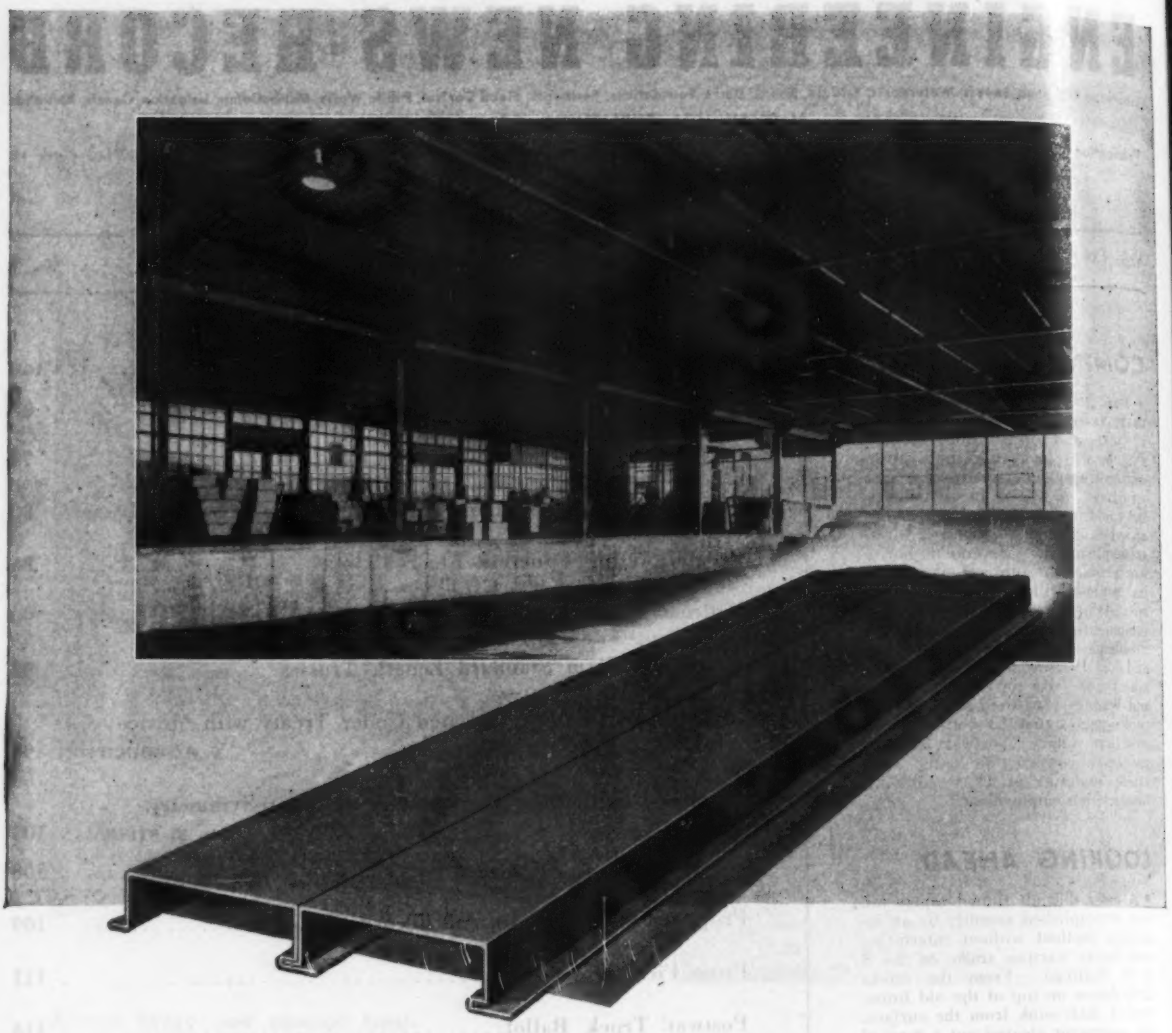

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for roofing permanence!

Truscon "Ferrobord" Steeldeck roofs, insulated to any required degree, and waterproofed, are of a broad and general usefulness. They are particularly adaptable to industrial buildings, school buildings, gymnasiums, auditoriums, public halls and theaters. "Ferrobord" Steeldeck has the advantage of being light in weight, permanent and fire resistant.

Truscon "Ferrobord" Steeldeck is made up of steel boards 6" or 12" wide. The sides of the boards are formed into ribs with tongue and groove at the bottom of the rib so that each board interlocks firmly with the adjoining boards. "Ferrobord" is made of 18 gage and 20 gage copper bearing or electro-galvanized steel. The 6" board is made with ribs 1½" and 1¾" deep. The ribs of the 12" board are 1½" deep, and there is an additional rib in the center of the board.

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The abutting ends of the boards are joined and stiffened by a butt joint clip. The top of the joint clip is flush with the top of the deck, presenting a smooth, continuous surface. To this surface the insulation and built-up roofings are applied.

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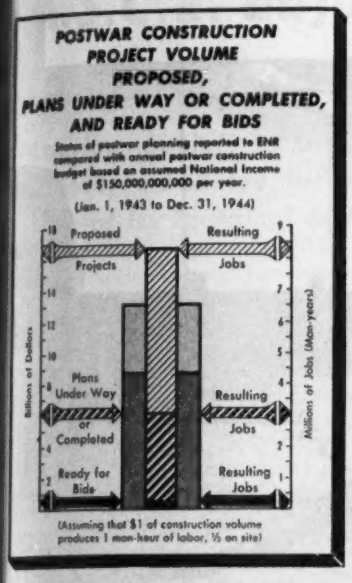
TRUSCON STEELDECK ROOFS
• *Cover the Continent* •

Two Years of Postwar Planning

From January 1943 through December 1944 Americans identified specific engineering projects proposed for postwar construction totaling $16,615,028,000 in estimated cost. On $6,053,983,000 worth of these projects engineers or architects, or both were at work on or had completed plans. But only $458,688,000 worth of identified and recorded projects were ready for bids with plans completed, financing ready and site and legal problems settled. However, another $248,331,000 had plans completed but no financing, and $164,161,000 more had financing ready but plans not complete.


POSTWAR CONSTRUCTION PROJECT VOLUME PROPOSED, PLANS UNDER WAY OR COMPLETED, AND READY FOR BIDS
States of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to Dec. 31, 1944)
Proposed Projects
Resulting Jobs
Plans Under Way or Completed
Resulting Jobs
Ready for Bids
Resulting Jobs
Billions of Dollars
Millions of Jobs (Man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Excellent as these overall accomplishments are, the greater part of the burden is carried by relatively few states. States with better-than-average postwar planning records in both proposed and planning stages are Connecticut, New York, District of Columbia, Michigan, Texas, Montana, Washington, Oregon and California. Four other states, Pennsylvania, Maryland, West Virginia and Ohio, exceed the U. S. average per capita volume record in the plans under way or in completed stage according to *Engineering News-Record* statistics.

The planning stage volume is expected to provide 3,027,000 jobs for construction workers (one-third at the project site, and two-thirds in factories, mines, forests, etc.). If the total proposed project volume progresses into plans, 8,308,000 jobs are expected to be produced, assuming that one dollar of construction volume produces one man-hour of labor, and that construction labor works 2,000 man-hours per year.

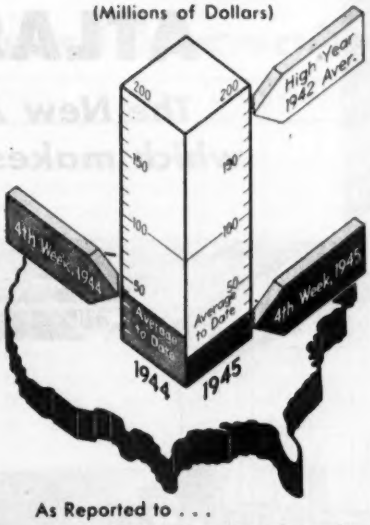
The proposed volume exceeds the minimum annual construction budget by 91 percent and is 27 percent above the maximum. Planning stage volume, a more realistic measure of progress in postwar construction, is 30 percent under the $8.7 billion minimum budget total, and is 54 percent below the maximum figure estimated for a single postwar year by *Engineering News-Record*, $13.1 billion.

(*Postwar Project Reports, page* 130)

HIGHEST RANKING STATES IN POSTWAR CONSTRUCTION PLANNING
(As reported to ENR from Jan. 1943 through Dec. 1944)
STATES ABOVE U. S. AVERAGE
In Both Proposed and Planning Stages
In Proposed Work Only
In Plans Underway Only

CONSTRUCTION ACTIVITY THIS WEEK

(Millions of Dollars)



As Reported to . . .
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of Jan. 25 1945	Cumulative 1945 (4 wk.)	Cumulative 1944 (4 wk.)
Federal	$5,471	$41,121	$124,597
State & Municipal	744	14,710	7,565
Total Public	$6,215	$55,831	$132,162
Total Private	2,576	32,362	24,356
U. S. Total	**$8,791**	**$88,193**	**$156,518**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Type of Work	Dollar Volume (Thousands) This Week	Cumulative 1945 (4 wk.)	Cumulative 1944 (4 wk.)
Waterworks	$280	$3,458	$1,418
Sewerage	325	2,238	2,237
Bridges	268	2,646	1,582
Highways	343	8,147	4,717
Earthwork, Waterways	283	1,192	3,115
Buildings, Public	3,470	23,647	91,919
Industrial	1,778	24,923	4,454
Commercial	204	2,613	18,332
Unclassified	1,840	18,329	28,744

NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (4 wk.)	Cumulative 1944 (4 wk.)
NON-FEDERAL	$26,080	$56,340
Corporate Securities	1,270	47,176
State and Municipal	24,810	5,089
RFC Loans	....	4,075
FEDERAL	$77,137	$90,832
Total Capital	**$103,217**	**$147,172**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Jan. '45	302.50	145.41
Building Cost	Jan. '45	236.51	127.85
Volume	Dec. '44	66	29

ATLAS DURAPLASTIC

The New Air-Entraining Portland Cement which makes better concrete at no extra cost

Duraplastic cement was used for the floors in the addition to Westinghouse plant at Lima, Ohio. The Green & Sawyer Co., general contractor, Lima.

In six years of use on a variety of jobs, Atlas Duraplastic air-entraining portland cement has proved itself one of the most significant advances in cement and concrete. It has been used with gratifying success since 1939 for over 2½ million sq. yds. of street, highway and airport paving and for a variety of other jobs including foundations, sidewalks, tanks, retaining walls, houses and other structures.

Experience on these jobs shows that Atlas Duraplastic cement requires less mixing water, makes concrete more plastic, more workable, more uniform and more durable, reduces segregation and bleeding, and produces concrete that is highly resistant to the action of freezing and thawing weather.

Duraplastic sells at the same price as regular cement, calls for no additional materials, spreads, screeds and finishes easily, makes better concrete at no extra cost.

Send for free booklet on Duraplastic cement and concrete. Write to Technical Service Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y. Offices: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

ENR-D-12

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

THE AIR-ENTRAINING PORTLAND CEMENT ORIGINATED AND DEVELOPED BY UNIVERSAL ATLAS

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • JANUARY 25, 1945 • VOLUME 134 • NUMBER 4

A.S.C.E. adjusts operations to meet travel restrictions

American Society of Civil Engineers cancels meetings normally scheduled for 1945 and plans to stimulate work of its technical divisions.

Plans to conform to the restrictions on the holding of large meetings that go into effect on Feb. 1 without undue loss of service to its members were inaugurated at the 92nd annual meeting of the American Society of Civil Engineers, held in New York, Jan. 15-19, a meeting that may be the last large gathering of members for many months. The board of direction cancelled the annual summer convention, also the spring and fall regional meetings and the local sections' conferences normally held in connection with the quarterly meetings. The board set its next meeting for April in Chicago, at which time more complete plans for carrying forward the activities of the society without meetings are to be formulated.

Existing requirements as to the number of meetings that must be held by local sections are to be set aside temporarily. On the other hand, the sections are to be asked to increase their activities directed toward stimulating advance planning for postwar construction and to plan to aid returning soldiers in getting reestablished in civil life. Student chapter activities also are to be stimulated. The Committee on Student Chapters was enlarged and funds were provided to make it possible for the committee to visit the chapters.

Postwar construction

Work of the committee on postwar construction is to be continued, attention being centered on developing effective contacts between the local sections and local committees of the Committee for Economic Development. These relationships are expected to be enhanced through the work of the C.E.D. Action and Advisory Committee, set up late last year with Malcolm Pirnie, president of the A.S.C.E., as chairman and with members of the A.S.C.E. Committee on Postwar Construction as members of the new C.E.D. committee.

Details of the program of the Committee on Postwar Construction were given to the board of direction by Mark Owen, director of the committee's operation, and to the members assembled for the annual luncheon meeting by G. Donald Kennedy, chairman of the committee. Mr. Kennedy emphasized the need for concentrating on private construction, as private work makes up two-thirds of the national construction budget in the country at large.

John C. Stevens
New president A.S.C.E.

The Committee on Registration of Engineers was authorized to call a meeting of representatives of other engineering societies to undertake the draft of a new definition of "professional engineering." The definition now in the model registration law recently was characterized by the Illinois Supreme Court as so broad in its scope as to make the law unenforceable, hence it is hoped to find a definition that may be more acceptable.

Collective bargaining

Thirty local sections have amended their constitutions to permit the establishment of collective-bargaining groups and are now prepared to undertake the creation of collective-bargaining units, according to the Society's Committee on Employment Conditions. Two other sections have set up committees on employment conditions, and seven sections have definitely decided against any such action. Two sections have asked the board of direction to work for a revision of the National Labor Relations Act. Upon the recommendation of the Committee on Employment Conditions the board agreed to recommend to all sections that have not set up a local committee on employment conditions that they set up such a committee with instructions to keep itself informed on employment conditions as they affect engineering employees in the section's area.

Seabury seeks to retire

George T. Seabury, secretary of the society, asked the board of direction to consider the appointment of a new secretary when his current term expires in April as he will then have reached the age of 65, at which he may retire under the society's retirement system. Mr. Seabury has served the society as secretary for the past 20 years.

Members honored

Honorary membership in the society was conferred on five members at the annual meeting. The recipients are: Arthur J. Dyer, chairman of the board, Nashville Bridge Co., Nashville, Tenn.; Major General Charles P. Gross, head of the Transportation Corps, U. S. Army; Horace W. King, professor emeritus at the University of Michigan; Louis C. Sabin, vice president of the

Lake Carriers' Assn., Cleveland; and Arthur Surveyer, consulting engineer, Montreal, past president of the Engineering Institute of Canada.

John Fritz Medal awarded

Award of the John Fritz Medal, highest honor in the engineering field, was made to John L. Savage, chief designing engineer, U. S. Bureau of Reclamation, Denver. As Mr. Savage is in India on special work for the government of India and China, the award was made to his sister, Mrs. Mary C. Wharton.

The Norman Medal, highest of the A.S.C.E. awards, went to a junior this year for the first time in the society's history. Ralph B. Peck, research assistant professor at the University of Illinois, received the medal for his paper on earth pressure measurements in the Chicago subways. The society's second honor, the J. James R. Croes Medal, also went to one of the research men at the University of Illinois, Prof. Nathan M. Newmark.

The Thomas Fitch Rowland Prize went to Eugene L. Grant, professor of economics of engineering at Stanford University; Gordon R. Williams, senior hydraulic engineer in the Office of the Chief of Engineers, U. S. Army, received the James Laurie Prize; the Collingwood Prize for Juniors was awarded to Walter L. Moore, senior research engineer, Lockheed Aircraft Corp.; and the Construction Engineering Prize went to Fred W. Stiefel.

A new award, created last year by J. C. Stevens to stimulate hydraulic research, was granted jointly to Boris A. Bakhmeteff and Nicholas V. Feodoroff of the Columbia University staff.

New officers

John C. Stevens, consulting engineer of Portland, Ore., was elected president to succeed Malcolm Pirnie. New vice presidents are A. C. Polk, consulting engineer, Birmingham, and Ernest E. Howard, consulting engineer, Kansas City. New directors are: Charles W. Bryan, Jr., vice president, Federal Shipbuilding & Drydock Co., Kearny, N. J.; Thorndike Saville, dean, college of engineering, New York University; Howard T. Critchlow, chief engineer, State Water Policy Commission, Trenton, N. J.; John H. Gardiner, district engineer, U. S. Geological Survey, Tucson, Ariz.; Harry F. Thomson, vice president, General Material Co., St. Louis; and Oscar H. Koch, consulting engineer, Dallas, Texas.

Summaries of the papers and discussions at technical sessions of the A.S.C.E. annual meeting will be given in next week's issue.

Mexican water treaty now before Senate

Hearings on the water treaty with Mexico (see p. 93 of this issue) were begun on Jan. 22 before the Senate Foreign Relations Committee. In a statement read to the committee by Undersecretary Grew, Secretary of State Stettinius urged approval of the treaty.

"With an average of over 7,000,000 acre-ft. of water now wasting annually through Mexican territory into the Gulf of California," said Mr. Stettinius, "it is of the utmost importance to both nations that there should be an allocation, once and for all, of the waters of this stream, so that, on the one hand, conflicting development and over-expansion, with their attendant disastrous consequences, may be checked and, on the other hand, development may proceed in an orderly and secure manner, free of uncertainties as to future available water supply which hamper and retard sound growth."

Regarding the Rio Grande, Mr. Stettinius said that a division of the waters between the two countries has been agreed upon which, when coupled with the building of international dams, will protect existing uses and make possible considerable expansion.

Senator Sheridan Downey of California, told reporters that he will offer an amendment to the Mexican water treaty to split it into two documents, one dealing with the waters of the Rio Grande and the other dealing with the Colorado.

His statement followed a description by Senator Carl Hayden from Arizona of an alleged "trade" between the California and Texas delegations in Congress at the time of the passage of the Boulder Dam Act in 1927.

At that time, Hayden said, it was "generally understood" that Texas would support Boulder Dam in return for a California promise that some of the waters stored there would be given to Mexico. In return for that water, Mr. Hayden said, Mexico was to give Texas a large percentage of the water from the Rio Grande.

L. M. Lawson, American commissioner on the International Boundary Commission, denied under questioning by Senator Downey that any such understanding or "trade" influenced the treaty negotiations in 1943. "At no time was a trade contemplated," Mr. Lawson maintained. "The treaty was negotiated under the normal treaty system, on the basis of geographical necessity and normal relations between nations. There was no consideration of a trade at all."

Chairman Connally tried unsuccessfully to block questioning along this line, but Senator Downey insisted that he be permitted to ask Mr. Lawson if there was not a provision in the Boulder Dam Act which expressly restricts use of Colorado water to the U. S. "That's right," Mr. Lawson replied.

• • •

AWWA directors select Thompson for president

Leonard N. Thompson, general superintendent and engineer of the St. Paul Water Department, was nominated for the presidency of the American Water Works Association at a meeting of the directors held in New York City on Jan. 16. At the same time, Wendell R. La Due, chief engineer and superintendent of the Akron Water and Sewerage Bureau, was nominated for vice president, and William W. Brush, editor of *Water Works Engineering*, for the treasurer's post. Unless additional nominations are offered by members of the association up to March 1—which has never been done heretofore—the list chosen by the directors will be elected.

The board voted to cancel the annual convention, which is scheduled for early in May, provided the War Convention Committee of the O.D.T. refuses to grant permission. The secretary of the association was instructed to file a petition with the federal authorities requesting this permission.

Honorary memberships were voted to: Willard Chevalier, publisher of *Business Week*; Robert W. Angus, professor emeritus of the University of Toronto; and to George W. Booth, chief engineer, National Board of Fire Underwriters.

The John Goodell prize, established by *Engineering News-Record*, was awarded to H. V. Pederson, superintendent of the Marshalltown, Iowa, waterworks, for his paper on calcining sludge. No award was made by the John M. Diven Medal committee.

Other action taken by the directors included approval of the findings of the special committee on depreciation (which are not in harmony with the proposals of the National Association of Railroad and Utility Commissioners), and a statement of the association's position concerning the federal drinking water standards.

In regard to the latter the board expressed the opinion that since certain primary differences of viewpoint have not been reconciled, further efforts should be made to develop an understanding with the U. S. Public Health Service.

Harry Jordan, secretary of the association, reported that membership had reached a new high of 5,485, which is a net gain of 515 since last year.

Aeration and digestion studies indicate sewage treatment economies

New York State Sewage Works Association meeting focused on modified aeration practice and high temperature sludge digestion

Construction and operating economies in postwar sewage disposal plants could be forecast on the basis of new information revealed at the annual meeting of the New York State Sewage Works Association, which was held in New York City on Jan. 19.

Modified sewage aeration, which has now had more than a year of practical demonstration at the new Jamaica treatment works in New York City, has proven the potentialities that were predicted sometime ago on the basis of experimental work, according to Lloyd R. Setter, principal sanitary chemist. Modified aeration is the term employed for operation in which shorter periods of aeration are used and a lesser quantity of active biological floc is returned to the aerators; consequently, there is less expenditure of compressed air than is used in conventional activated sludge.

Dr. Setter reported that only 0.34 cu. ft. of free air per gallon of sewage was used for aeration. With 2 to 2.5 hr. aeration it was possible to obtain 70 percent reduction of B.O.D. and 83 percent removal of suspended solids in the settling tanks. With 4 to 5 hr. aeration the results were 75 percent removal of B.O.D. and 85 percent reduction in suspended solids.

High temperature digestion

Plant-scale studies of stage digestion —operating the primary digestor in the thermophilic (120—135 deg.) range and then transferring this pre-heated sludge to a second digester operating in the mesophilic (85—90 deg.) range—indicate attractive possibilities, according to Anthony J. Fischer, development engineer of The Dorr Co., Inc., New York.

He pointed out that the thermophilic digester would take a load 1.6 times greater than that sustained by a mesophilic tank. Therefore, it was possible to gain at least 60 percent greater digestion capacity simply by operating at the higher temperature. Sludge produced under such conditions, however, requires further digestion under mesophilic conditions in order to improve the quality of drainability.

Dr. Fischer reported that for existing overloaded plants the system of combined high-low temperature digestion offered the opportunity to avoid costly extensions. He stated that there was considerable doubt, however, whether the system was justified for new plants, especially in the small or medium plant ranges.

Digestion tank loading

Laboratory studies coupled with operating records from three plants enabled Dr. Willem Rudolfs, chief, department of water and sewage research, New Jersey Agricultural Experiment Station, to discuss some relationships between loading and supernatant liquor in digestion tanks. He concluded that the optimum loading of 2-stage digesters appears to be about 0.1 lb. of dry volatile solids per day, if digestion temperature is maintained at 82-84 deg. Such digesters are considered to recieve their maximum loading when about 40 percent of the added fresh solids volume can be obtained in the form of supernatant liquor.

Officers and awards

George E. Symons, associate editor of *Waterworks and Sewerage* magazine, was elected president of the association to succeed William H. Larkin, district engineer of the New York State Department of Health.

The Kenneth Allen memorial award was presented to C. A. Holmquist, director of the division of sanitation of the New York State Health Department, for his outstanding contributions to the advancement of sanitation practice.

. . .

More engineering bills introduced in Congress

Engineering bills continue to be introduced in Congress at a great rate. In *Engineering News-Record* Jan. 11, vol. p. 16 the bills submitted up to that time were mentioned. To that list are added the following: H. R. 1136, autorizing a survey in Ohio of the military route of Gen. Anthony Wayne during the Indian Wars, with a view to constructing a national parkway to be known as the General Anthony Wayne Memorial parkway, $30,000 being authorized for an appropriation for the survey; H. R. 1184, authorizing the Slater Branch Bridge and Road Club to construct a suspension bridge across the Big Sandy River at Williamson, W. Va.; and H. R. 1186, authorizing preliminary examination and survey of Tillamook Bay, Ore.

Also, H. R. 1187, providing for a preliminary examination and survey of Alsea Bay, Ore., with view to constructing a harbor; H. R. 1210, authorizing the erection of a Veterans Administration general medical hospital in Eastern Pennsylvania; H. R. 1275, authorizing the Federal Works Agency to construct a film-servicing building and vaults in the District of Columbia at a cost not to exceed $2,800,000; H. R. 1373, providing for the construction of a marine hospital at Los Angeles, Calif., not to exceed the sum of $2,600,000; S. 191, authorizing $110,000,000 for a hospital construction program; S. 197, authorizing the Minnesota Department of Highways to construct a bridge across the Pigeon River; S. 233, giving congressional consent to North Dakota for the construction of a free highway bridge across the Missouri River from McLean County to Mercer or Oliver County; and S. 234, authorizing the construction of a highway bridge across the Yellowstone River near Fairview, Mont.

. . .

Gordon Fair on board of Rockefeller Foundation

Gordon M. Fair, professor of sanitary engineering at the Harvard University graduate school of engineering, has been elected as one of the scientific directors of the International Division of the Rockefeller Foundation. He is the first sanitary engineer to serve in this capacity since the establishment of the Foundation some three decades ago.

The Rockefeller Foundation, which is engaged in world-wide activities relating to health and sanitation, furnishes assistance to foreign governmental agencies in the promotion of public health. The board, on which Professor Fair is one of six members, determines policies and direction. His term of office extends for three years.

Prior to joining the Harvard engineering faculty in 1922, professor Fair was assistant director of the sanitation division, League of Red Cross Societies, in Geneva, Switzerland. During the last three years he has been serving as consultant to the health and sanitation division of the Office of the Coordinator of Inter-American Affairs, which is concerned with the promotion of sanitation programs in Central and South America. He has also been engaged on special committee assignments for the National Research Council and the War Manpower Commission.

Canadian WLB considers labor law for engineers

Asking that engineers and scientists be excluded from the provisions of P.C. 1003, Canadian order-in-council governing labor relations in all war industries and, in many provinces, in all other industries as well, representatives of 14 professional engineering and allied societies, headed by the Engineering Institute of Canada and the Dominion Council of Professional Engineers, representing about 40,000 members, presented a brief on Jan. 9 to Canada's National Wartime Labor Relations Board. The case had been referred to the board by Minister of Labor Mitchell, after a draft of a new order-in-council embodying the aims of the engineers had been submitted to him (*ENR*—Dec.. 21, 1944, vol. p. 788).

The brief suggested that a separate board be set up to govern bargaining for the professional and scientific group, and new legislation was proposed for this purpose. Strong opposition was voiced by spokesmen for the Canadian Congress of Labor (C.I.O.) and the Trades and Labor Congress (A.F.L.), who urged that all workers should come under the same legislation, suggesting that separate legislation would be setting up national class distinctions. A representative of the Canadian Manufacturers Association urged that either professional and scientific workers continue to be regarded as exempt from the provisions of the existing order or that the order be amended so that it would not apply to such workers. He took the same view as the labor spokesmen with regard to the proposal for separate legislation.

During the hearing, Judge G. B. O'Connor, chairman of the board, asked whether an amendment to the existing labor code would satisfy the delegation. The whole question was finally taken under advisement.

Poll favors new law

Submitted on behalf of professional engineers and scientists by a committee composed of R. E. Heartz, W. P. Dobson and A. E. MacRae, the brief states that a poll of this group showed that 92 percent were in favor of collective bargaining under a new order-in-council relating specifically to themselves and that only one percent indicated a preference for trade unions as their bargaining agents. In support of the proposed order, the brief pointed out that by virtue of their professional and scientific training, such employees are distinctly distinguishable from the general body of employees.

"Professional scientific workers," the brief stated, "usually occupy a functional position which is between labor and management. Their function has primarily to do with advising on, reporting on, designing of, and the supervising of the construction of various projects and research, as well as the operation of various processes and the like. To place professional scientific workers performing such functions in a group with management or labor for bargaining purposes would tend to reduce the efficiency with which they can perform their major function, because of the new loyalty which they would have to assume in relation to the group to which they are associated."

. . .

Improvements proposed for port of Portland, Me.

A bill is ready to be introduced in the Maine legislature seeking approval of a $10,000,000 bond issue proceeds from which would be used to improve the port of Portland, including deep water piers. William S. Newell, president of the Bath Iron Works, builders of U. S. destroyers, has gone on record in favor of such a project.

Bonds would be 20-year issues limited to 3 percent interest and payable by the state. To reduce the indebtedness it it suggested that the state, if possible, sell the present state pier to the U. S. Navy Department, and use the money for some of the new work.

A $2,400,000 postwar program to modernize and consolidated the Nashville, Tenn., water system is being planned by the city water commission.

Inter-American Affairs Institute reorganized

Lt. Col. Harold B. Gotaas, director of the health and sanitation division of the Coordinator's Office, recently was made executive vice-president of The Institute of Inter-American Affairs. This is the post formerly held by Maj. Gen. George C. Dunham, who now becomes president of the Institute to succeed Nelson A. Rockefeller.

The institute of Inter-American Affairs is the corporate entity by means of which the Coordinator's Office collaborates with Latin American countries in wartime health and food supply projects. Corresponding agencies have been established in most of the countries participating in the health program.

The appointment of Colonel Gotaas to this new post marks his second promotion within a very short time. He assumed the directorship of the health and sanitation division only last December (*ENR* Dec. 14, 1944, vol. p. 736). His new post with the Institute carries with it the title of acting assistant coordinator of Inter-American Affairs.

. . .

San Francisco has plans for a $2,750,000 tunnel

Largest postwar road construction expenditure proposed by San Francisco, in plans totalling $4,705.000 filed recently with the California Department of Public Works, is $2,750,000 for a tunnel under Russian Hill on Broadway between Mason and Larkin streets. Surveys to determine feasibility of the project have been under way by city engineers since September.

JOBS OF THE WEEK

WATER SUPPLY IMPROVEMENTS, Montreal, Que.

Atlas Construction Co., Montreal, Que., has been awarded a contract for additional filters at existing filtration plant, by City of Montreal, at $1,439,965.

RUNWAYS, Georgetown, Tex.

U. S. Engineers, Fort Sam Houston, received the lowest bid for runways, night lighting, at airport from Uvalde Construction Co., and Texas Bithulitic Co., Dallas, at $738,182, alternate 1 from Brazos Construction Co., Mineral Wells, at $630,550, and alternate 2 from Standard Paving Co., Fort Worth, at $935,016.

STORAGE BUILDINGS, Longue Point, Que.

Anglin-Norcross, Quebec, Ltd., Montreal, Que., has been awarded a contract by the Department of National Defence, Ottawa, Ont., for constructing 3 additional storage buildings, at ordnance depot. The estimated cost is $1,250,000.

NATURAL GAS STORAGE TANK, Long Beach, Calif.

Bethlehem Steel Co., Vernon, Calif., was the lowest bidder for 5,000,000 cu. ft. capacity natural gas storage tank, with welded pipe, at $611,600. Stacy Brothers Gas Construction Co., Cincinnati, Ohio, was low on same project with welded and riveted pipe, at $689,600. S. E. Vickers is city manager.

*Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 161.

Roadbuilders study ways to implement federal-aid highway act provisions

Functioning of postwar program is chief concern of American Road Builders meeting in Chicago. Skelly is new president.

Now that money for the postwar roadbuilding program is assured by recent passage of the new federal-aid highway act, the next step is to lay the groundwork for most effective prosecution of the program under terms and conditions of the act, according to discussions at the annual meeting of the American Road Builders Association in Chicago Jan. 16-19. The act was declared to be pioneer highway legislation in that it provides, for the first time, federal aid for secondary and related local roads and for major city thoroughfares, to be administered by the state highway departments under the supervision of the Public Roads Administration. Thus, also for the first time, close cooperation will be required between state officials and those of local governmental agencies. The need for enabling legislation in many years to facilitate such cooperation was stressed.

Yet, the 900 delegates attending the meeting were assurred again and again that Congress and the state and federal highway officials supporting the bill, do not intend that the act in any way will usurp the roadbuilding functions of local governments. But, they were warned, unless the cooperation of all is forthcoming in developing roadbuilding activities and resulting employment to the fullest extent provided for by the act, there is danger that a "super" federal agency, such as WPA, might step in with a made-work highway program of construction.

Highway act criticized and upheld

Two Congressmen expressed directly opposed ideas as to the adequacy of the new postwar federal-aid highway act. James W. Mott (Ore.) member of the House roads committee, declared the act is "entirely inadequate as a postwar bill, and we will have to come back to Congress for more funds." Without stating wherein the present act is deficient, he hopes the 79th Congress will produce a real comprehensive bill "otherwise we will have many roads built under some government agency similar to WPA, because our needed highway program is three or four times that provided by the 1944 bill."

J. W. Robinson (Utah), chairman of the House roads committee, struck back at Mott's criticism in a detailed analysis of the act. He pointed out that the bill was passed after months of discussion and hearings, with the endorsement of PRA and AASHO, and that it "represents the composite views of the committees in Congress that have the prime responsibility of road legislation." Robinson declared the bill is adequate, and will provide funds and the leadership for a great highway system for the future.

Furthermore, he said, it is the first complete highway measure ever passed by Congress, recognizing for the first time all the classes of highways—the primary federal-aid system, the urban extension, and the rural feeder roads. It calls upon the states to set apart within the primary federal-aid network a special national system of interstate highways, constituting an attack against the work-relief type of highway project. He warned, however, that the passage of the bill is only the beginning of an important road program, the execution of which depends upon the state highway departments and on their ability to establish working relationships with the county and local governments to carry out the new and expanded postwar highway program contemplated under the act.

James J. Skelly
New president of the A.R.B.A.

Seabees and Army Engineers

The construction portions of the armed services were represented on the program by Capt. H. W. Johnson (CEC) U. S. Navy, and Major Gen. Eugene Reybold, chief of engineers, U. S. Army. Captain Johnson told of the job of building the Seabee organization of 300,000 construction men, whose duties have placed many of them in the combat class and who have found need of their military training. He said the Seabees need more construction men, especially highway builders, for there is much construction yet to come.

He outlined all that is involved in building a big naval base on foreign shores as but one example of activities of the Seabees. Such a base, must, of course, have a suitable anchorage, which involves surveying and mapping the harbors, and usually building a breakwater and dredging the channel. The shore facilities require wharves, piers, shops, warehouses, airports with shops, steel tank farms, a tanker wharf, ammunition storage, torpedo shops, base hospital, housing and mess buildings, water supply, sanitation facilities, electric plant and roads, to mention a few. The average base requires some 200 miles of roads and over a million tons of shipping. Another example of Seabee activity is that of supporting landing troops on Pacific island invasions. Bulldozers lead the way, and one of the first jobs is to establish fighter landing strips, 150 ft. wide with 50 ft. shoulders, 3,600 ft. long, which are extended to 6,500 ft. for bomber use as soon as possible.

General Reybold pleaded for the recognition that war is the most important business for everyone in this country. We are using some of our carefully accumulated reserve of military supplies and equipment faster than we can replace them, he declared and for the first time there is a real threat of American production may fail our fighting forces. With our manpower situation at its most critical stage in our history, we are up against the most urgent and most difficult production assignment we have yet been called upon to fill.

The need for engineer equipment and supplies alone is tremendous. During 1943 the army bought nearly $1½ billion worth of such supplies, of which $500 million went for construction equipment. In 1944 purchases amounted to $2 billion, and that figure will be approached by the value of materials and supplies needed this year. Tractors, bulldozers and cranes and shovels remain critical items. Even when we meet our schedules, he declared, we do not have enough, because schedules are a compromise between actual requirements and what the industry can produce. In addition to engineer equipment, the army's most urgent needs today are for more artillery and mortar ammunition, more

A.R.B.A. presents huge roadbuilding program

The theme of the American Road Builders Association meeting in Chicago last week was "Make No Little Plans for Postwar Highways." This exhibit was prepared in cooperation with construction equipment advertisers to publicize the A.R.B.A. "sound plan" for a 5-year roadbuilding program. It includes major highway construction, grade crossing eliminations, city traffic relief, urban streets and alleys, rural and village roads, and maintenance.

tanks, more heavy trucks and tires, more field and assault wire, and more canvas. Over 300,000 additional workers are needed to get our critical supply programs up to schedule, and still more thousands will be needed later this year.

Credit for its part in the war program was given the construction industry by General Reybold. This program reached a peak late in 1942, when the construction activity totalled $20 million per day. He stated that even now we have some $250 million worth of additional construction on the books, consisting mostly of modifications of extensions to existing munitions plants, airfields, hospitals and prisoner-of-war camps.

Built-in highway safety

Sidney J. Williams, general manager, National Safety Council, pointed out that highways are built with taxpayers' money for just one purpose—the movement of people and goods from one place to another and if the people or the goods are smashed up or delayed by an accident, to that extent the highway is inefficient and the taxpayers do not get full value for their money. He pleaded for building safety into the highways to be built following the war. Built-in safety is most effective, as has been proved by such example as fireproof building construction, and it makes for comfort and efficiency.

On highways with danger rather than safety built in—such as narrow pavements, high crown, slippery surfaces, no shoulders, frequent sharp curves, steep grades and limited sight distance—we must either suffer, year after year, the high cost of numerous accidents, or to pay, year after year, the high cost of additional police, court trials and intensive public education for the purpose of reducing those accidents. In either case the losses or expenditures, capitalized, would more than pay for the safer highway, especially if the safety features are built in at relatively low cost when the highway is first constructed.

Postwar construction equipment

There will be no radical changes or outstanding improvements in the design or manufacture of highway construction equipment for at least one year after the war, asserted W. A. Roberts, vice president, Allis-Chalmers Manufacturing Co., Milwaukee. Under such a program the equipment manufacturing industry as a whole contemplates very few reconversion problems as much of the roadbuilding machinery now being built for combat duty will serve equally well in peacetime work. Neither the U. S. Army nor the equipment industry can forecast the amount of roadbuilding machinery which will be available after the war. And this will not be known for some time after hostilities cease, he said.

Although a small amount of equipment and repair parts are beginning to appear on the market, Mr. Roberts warned contractors against over-buying of such material as it becomes available in increasing amounts. The principal danger of stocking up now with excess equipment lies in the fact that it may deteriorate to such a point or become so outmoded before peacetime construction hits its full stride as to become high production-cost equipment. Moreover, much of the equipment now being manufactured necessarily contains certain substitute metals, which is not conducive to low maintenance costs, he said.

Looking to the postwar development of construction equipment, Mr. Roberts stressed the need for improvements in design of large grading machinery which will reduce the amount of fatigue for the operator. This heavy machinery must be made so that an operator can work it throughout an 8-hr. day without becoming exhausted. In conclusion he again stressed the need for distributing surplus war construction equipment through recognized manufacturer-distributor channels, similar to the contention expressed at last year's meeting of the association (*ENR* Feb 10, 1944, vol. p. 170).

County road standards

Although the 1944 highway bill contains provisions for the expenditure of $150 million annually for the construction of secondary and feeder roads dur-

ing the first three postwar years, the county highway officials division of A.R.B.A. is deeply concerned over the methods of administrating the funds and the design standards covering county road construction. It is generally recognized that no one policy of design or set of standards can be established which will be applicable to all county highway construction throughout the country. Rather it is a question of geographical location, traffic intensities and the anticipated usage of the various roads to be built.

Otto S. Hess, engineer-manager, Kent County Road Commission, Grand Rapids, Mich., urgently requested the assembled county highway engineers to take immediate steps to set up programs for needed secondary and feeder road construction and to do everything possible to promote closer cooperation between state and county highway departments responsible for this work. Joint state and county highway committees should be established throughout the country to lay out proposed construction programs in the order of their greatest necessities and to recommend design standards and construction procedures for approval of the Public Roads Administration. Such foresighted action now, asserted Mr. Hess, will greatly expedite the inception of this vital phase of postwar roadbuilding and aid materially in its being prosecuted properly.

Local government relations

Definite recognition of the need for federal aid in the construction of urban highways and secondary roads contained in recent federal legislation not only is an important step in the proper development of a comprehensive highway system, according to H. G. Sours, Ohio Director of Highways, but it also permits greater research, cooperative study of both technical and financial problems inherent in roadbuilding as well as the development of improved design standards and construction practices.

Such a program, however, must be soundly organized and carefully developed, he warned, so that proper relations may be established between the federal government, the states and their subdivisions. Clear-cut rules must be established and regulations adopted, with enough flexibility so as to be practical and adequate to meet various conditions. Postwar urban and county highway construction is a joint enterprise and its success or failure will depend on whether or not real and actual cooperation is developed and carried into effect, he said.

Many states will need to pass enabling legislation authorizing state highway departments to negotiate and make some necessary agreements with the city and county subdivisions. It would be unfortunate indeed, concluded Mr. Sours, for the roadbuilding agencies to face a position of willingness to go forward with a well-conceived program, only to be halted by legal and technical obstacles.

Postwar airports

Postwar airport construction and its related problems were covered in detail in several authoritative papers presented at one morning session of the convention. "No phase of aviation activity has suffered more from conflicting reports and confusing statements than has the subject of airports," said Charles B. Donaldson, director of airports, Civil Aeronautics Administration, Washington, D. C. Referring to the billion-dollar national airport plan recently presented to congress (*ENR*—Dec. 7, 1944, vol. p. 725), Mr. Donaldson asserted that a great many people are under the impression that federal aid is now available for airport development. This is not the case, he said.

The only assistance CAA can render at present is that of giving consulting advice on planning, site selection, and airport operational and management problems. Such counsel, however, is available to all civic bodies and anyone in need of it. In the years just ahead aviation inevitably must assume a position beside rail, water and highway systems as an accepted major form of transportation, declared Mr. Donaldson, and Congress will be kept fully informed of the need for adequately improving our existing system of airports, he concluded.

Only an enlightened public opinion can assure proper Federal legislation which will foster the kind of aviation progress vital to the future of the United States, contended Lowell H. Swenson, manager, National Aeronautic Association, Washington, D. C. Three main principles govern the development of a sensible and adequate system of airplane landing facilities in this country. They include a sound legislative foundation, education of the public to the need for adequate landing facilities and cooperation of community leaders in enlisting public support behind local projects.

Mr. Swanson pointed out two phases of the proposed airport development program which are of particular interest to the construction industry. The first one includes recommendations by CAA that private consulting engineering firms be engaged for planning many of the proposed landing facilities. The other is the contention that all airport construction be accomplished through a system of competitive bidding.

Airport design has come a long way during the past four years but those in close contact with it realize it still is in its "swaddling" clothes, asserted Harold J. McKeever, editor, *Roads and Streets*, Chicago. This is due to (1) most airfields have been paved under design formulas borrowed or adapted from highway construction and (2) heavier planes are calling constantly for stronger and larger runways. Four years ago the DC-3 airliner had a maximum wheel load of 12,500 lb., but today we have military planes of 85,000-lb. wheel loads.

As an aid in providing properly designed airport runways the Engineering Department, U. S. Army, recently launched three major research projects, said Mr. McKeever. The Flexible Pavement Laboratory, U .S. Waterways Experiment Station, Vicksburg, Miss., will coordinate tests and investigations on bituminous pavements and their foundations. Similar investigations on concrete paved runways will be conducted in the Rigid Pavement Laboratory of the U. S. Army's Ohio River Division, Cincinnati. And the Frost Effects Laboratory of the U.S.E.D. Soils Laboratory at Boston will study subgrades or base courses subject to frost.

Our wartime airport construction program has given to American-made construction machinery the first real test of its speed and work capacity which the industry has been developing during the past 15 years, declared Theodore Reed Kendall, editor, *Contractors and Engineers Monthly*, New York City. Construction-by-contract of more than 1,500 air bases, stations and airfields at a cost of some $2,500,000,000 has contributed a tremendous "work-power" to the construction industry.

An indication of the size of this huge program is contained in the fact that the Army alone has built within the continental United States and at offshore bases more than 480,000,000 sq. yd. of roads, airfield runways and parking spaces; equivalent to thirteen 21-ft. wide highways extending from New York to Seattle. This is exclusive of the vast naval aviation construction program, he said.

All this experience gained in building military facilities undoubtedly will speed construction and insure economy in the coming era of civilian airport and flight strip construction for commercial services and private flying when this war is ended, said Mr. Kendall.

Experience has proved that the most effective method of snow handling at airports is to remove all of the snow from the runways, taxi strips, aprons and around the buildings, said Hal W. Hunt, associate editor, *Engineering News-Record*. Outside of these areas it

(*Continued on page 77*)

Cities must plan better says General Fleming

"At the present time no American city, so far as I know, is planning its own salvation realistically," Maj. Gen. Philip B. Fleming, administrator of Federal Works Agency told the Sub-Committee on Housing and Urban Redevelopment of the Senate Postwar Economic Policy and Planning Committee on Jan. 11. "Carefully planned future development of our cities will prove expensive. In the long run, however, it will be far less costly than a continuation of the unplanned, haphazard cycle of growth and decay which has been tolerated heretofore."

Gen. Fleming claimed that the city has become an increasingly unattractive place in which to live and that those who can afford to do so move to suburban regions, leaving behind blighted areas inhabited only by those too poor to remove. Thus, the city loses leaders and income. Unless the city is made a better place in which to live, these trends cannot be reversed, nor can the financial situation of the urban districts be improved.

The financial cost of slum areas is made manifest by a recent study of a group of large cities of the country, which showed that while each slum district contained, on the average, a third of the population, it paid in real estate taxes only 6 percent of the total city revenue, yet absorbed 45 percent of the city's resources in the cost of such services as fire and police protection, relief and sanitation. This is aside from the social cost in terms of disease, crime and juvenile delinquency.

"Intelligent zoning," the general said, "where rigidly enforced, is helpful. It has not succeeded in stopping the drift from the city, however, nor is there any magic in it to reclaim areas already blighted."

To cure the slum blight disease, Gen. Fleming recommended a major operation. He cited a plan submitted last spring to the House Committee on Public Buildings and Grounds by Commissioner Reynolds of the Public Buildings Administration to demolish whole blocks of slum tenements over areas a mile or two square and to eliminate the gridiron street pattern. High-speed highways would be provided away from the housing, with limited access at appropriate intervals. Former slum lands, cleared by municipal authorities, free from noise and city dirt and made safe from traffic, might be sold for development by private capital according to a controlled plan.

While the Federal Works administrator is authorized by the War Mobilization and Reconversion Act of 1944 to make loans for public works planning to states and their political subdivisions, no appropriation for this purpose has yet been approved.

Official U. S. Army photo

Harry W. Loving receives Exceptional Service Award

The emblem for Exceptional Civilian Service has been awarded to Harry W. Loving of Charlotte, N. C., head of the Price Adjustment Branch, Readjustment Division, Office of the Chief of Engineers.

In the picture above Maj. Gen. Eugene Reybold, Chief of Engineers, left, is shown presenting the award to Mr. Loving while Maj. Gen. T. M. Robins, Deputy Chief of Engineers, looks on.

In presenting the award, Major-General Reybold, called attention to Mr. Loving's exceptional service to the War Department in directing the negotiation and renegotiation of construction and supply contracts.

In the latter assignment, the various Price Adjustment offices operating under Mr. Loving's supervision have directly recovered for the government $168,408,000 in excess profits, as of Aug. 30 last. Mr. Loving's assignment has taken him to northern Canada, Alaska, Panama, Hawaii, Australia, New Guinea, and other islands of the South Pacific.

Mr. Loving has been with the War Department since July 15, 1940, serving first with the Office of the Quartermaster General. When construction activities of the War Department were combined under the jurisdiction of the Office, Chief of Engineers, on Dec. 16, 1941, Mr. Loving was transferred to the Engineer Office.

BRIEF NEWS

Colorado State Manpower Director L. A. West has designated the employment service of the Colorado Society of Engineers as the authorized hiring channel for engineers in Colorado.

Mexico's production of cement, which has been far behind demands of building construction, will be tripled in 1945, bringing the yield for the year to at least 1,500,000 metric tons. This increased production, it is said, will result from the combined efforts of the federal and some states governments, and private interests.

Milwaukee, Wis., is collecting data on the life of the predominant types of paving to determine when present pavements will have to be replaced. The survey will cover 825 miles of streets and is directed by Walter M. Swietlik, commissioner of public works.

Alder Dam of the second Nisqually power project of Tacoma, Wash., is nearing completion. Construction crews are racing to keep ahead of the rising waters as they take up the rails of the relocated Chicago, Milwaukee, St. Paul & Pacific Railroad tracks and clear remaining timber. J. V. Gongwer is chief engineer of the project.

After surveying the Dartmouth, N. S., docks of the Halifax-Dartmouth ferry service, O. J. McCulloch, Montreal, consulting engineer, has recommended the construction of new docks of steel sheet piling. This has been approved by the ferry commission, and work is to be started this spring. A construction permit and priorities on materials and labor have been granted by the dominion government.

OBITUARY

Charles R. Ward, 69, who was Commissioner of Public Works for Brooklyn, New York City, from 1933 to his retirement in 1937 died in Brooklyn, Jan. 15. Mr. Ward was graduated from the Rensselaer Polytechnic Institute in 1895. He served successively as an assistant engineer to the old Rapid Transit Commission in charge of surveys on Manhattan Island; assistant city engineer of Waterbury, Conn., assistant engineer in the Brooklyn Topographical Bureau, and from 1906 to 1919 chief engineer in the Topographical Bureau in the office of the Borough President of Brooklyn. During his four years as Public Works Commissioner Mr. Ward supervised the completion of many major projects. On taking the office he resigned as head of the Charles R. Ward Engineering Corp., to which he returned in 1938.

Robert Grant Henderson, for 48 years contractor in Toronto, Ont., died Jan. 8.

Emerson J. Boyd, 65, Warren, Ohio, a director of the Wean Engineering Co., Warren, and the Broden Construction Co., Cleveland, died Jan. 10.

Allan Suteliffe, 65, chief surveyor for the Philadelphia Transportation Co., Philadelphia, Pa., died Jan. 10. He had worked for the company for 34 years.

William E. Weston, 58, former Marion County, Ohio, engineer, and resident engineer for the state highway department, died at Marion, Jan. 8.

James K. McGinnis, 60, for the last 18 years city engineer in Steubenville, Ohio, died Jan. 12.

George A. Rogers, 53, Little Rock, Ark., died Jan. 10. He was a retired civil engineer, and at one time was a supervisor for the U. S. Geodetic Survey, and also was employed by the Arkansas Flood Control Commission from 1937 through 1941. He surveyed the present water supply system for Little Rock.

Thomas Riggs, 71, commissioner of the International Boundary Commission and former Governor of Alaska, died in Washington, D. C., Jan. 17. As an engineer to the Commission on the Alaskan Boundary Survey from 1906 to 1913, Mr. Riggs was in charge of surveying the boundary between Alaska and Canada. Later he served as a member of the Alaskan Engineering Commission and was in charge of the location and construction of government railroads in the territory. He was appointed Governor of Alaska by President Wilson in 1918 and served for three years.

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A.R.B.A. Convention

(*Continued from page* 75)

has been found best to slope the new snow away from the runways, and roll and drag it into a hard-packed, smooth surface. Where snowfall is at all severe, a combination of plows and powered snow throwers give the best results.

Latin American interests

Charles M. Upham, engineer-director of the A.R.B.A. told of the program for training a few Latin American highway engineers, superintendents and master mechanics in this country, sponsored by the association and the Coordinator of Inter-American Affairs.

Engineers will spend three months with the Public Roads Administration, some engineering school or highway department, and then will work in the field for perhaps nine months. Superintendents and foremen will be put with contractors organizations or administrative forces and master mechanics will spend most of their time with equipment manufacturers. The cost of about $900 per man for the stay in this country will be borne by the sponsors.

The present plan is for only 20 men which Mr. Upham feels is inadequate and should be increased very considerably to compete equitably with what Germany did before the war and with what England is doing now and will augment in the future.

Executive officers

James J. Skelly, Media, Pa. contractor, was elected president of the American Road Builders Association for 1945, succeeding Carl W. Brown, chief engineer, Missouri State Highway Department. H. C. Whitehurst, director of highways, District of Columbia, was reelected treasurer.

Chosen for regional vice-presidents are: Paul B. Rheinhold, Pittsburgh, Pa.; W. A. Young, Macon, Ga.; E. R. Galvin, Massillon, Ohio, and C. H. Purcell, Sacramento, Calif. Newly elected divisional presidents include: Arthur F. Rannsy, Akron, Ohio, County Highway Officials' Division; Nathan L. Smith, Baltimore, Md., Municipal Division; and Charles W. Smith, Pensacola, Fla., Highway Contractors' Division.

MEETINGS

National

THE ENGINEERING INSTITUTE OF CANADA, 59th annual general and professional meeting, Winnipeg, Man., Feb. 7-9.

Regional and Local

CONSTRUCTORS ASSOCIATION OF WESTERN PENNSYLVANIA, annual meeting, William Penn Hotel, Pittsburgh, Pa., Jan. 31.

WISCONSIN COUNTY HIGHWAY COMMISSIONERS' ASSOCIATION, annual winter highway conference, Schroeder Hotel, Milwaukee, Wis., Jan. 30-Feb. 1.

COLORADO SOCIETY OF ENGINEERS, 29th annual convention, Shirley-Savoy Hotel, Denver, Colo., Feb. 1-3.

IOWA SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS, midwinter meeting, Des Moines, Ia., Feb. 6.

TEXAS WATER WORKS AND SEWERAGE SHORT SCHOOL, 27 annual meeting, College Station, Tex., Feb. 5-7.

IOWA ENGINEERING SOCIETY, 56th annual meeting, Hotel Ft. Des Moines, Des Moines, Iowa, Feb. 6-7.

WESTERN CONSTRUCTORS, INC. AND WISCONSIN CHAPTER, ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC., joint convention, Oshkosh, Wis., Feb. 13-14.

ILLINOIS HIGHWAY ENGINEERS AND COUNTY HIGHWAY SUPERINTENDENTS, annual conference, at University of Illinois, Urbana, Feb. 14-16.

OHIO SOCIETY OF PROFESSIONAL ENGINEERS, annual convention, Deshler-Wallick Hotel, Columbus, Ohio, Feb. 15-16.

ARKANSAS ENGINEERS CLUB, annual convention, Hotel Marion, Little Rock, Ark., Feb. 23-24.

ONTARIO GOOD ROADS ASSOCIATION, annual convention, Royal York Hotel, Toronto, Canada, Feb. 28-March 1.

Cancellations

UNIVERSITY OF ILLINOIS, 31st annual highway conference, scheduled for Feb. 14-16.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS, Birmingham, Ala., Feb. 21-22.

NEW JERSEY SEWAGE WORKS ASSOCIATION, 30th annual convention, Trenton, N. J., March 22-23.

OHIO SOCIETY OF PROFESSIONAL ENGINEERS, Columbus, annual convention, Feb. 15-16.

ASSOCIATION OF HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES, annual meeting, New York City, Feb. 28-Mar. 2.

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EDITORIALS

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January 25, 1945

With Engineers Overseas

APPEARING IN THIS ISSUE is the first of a new series of reports on the widespread activities of American engineers in the European Theatre of Operations prepared by Waldo G. Bowman, editor of *Engineering News-Record*. Mr. Bowman is now in France. While in England awaiting an opportunity to join the Army Engineers in France, he followed the invasion route to the ports of southern England and saw a variety of activities that contributed to the invasion and its aftermath. These are described in this issue. From Paris, Mr. Bowman sends word of having seen port reconstruction, bridging, and canal repairing on his way to that city, which operations will be reported in subsequent issues, as will his observations from the more active zones.

Well-Deserved Recognition

NEW RECOGNITION of the role that the sanitary engineer can play in the promotion of public health comes with announcement (see p. 71) of the election of Prof. Gordon M. Fair, of the Harvard University engineering faculty, as a member of the Rockefeller Foundation scientific board. To Professor Fair falls the honored distinction of being the first sanitary engineer to be represented on the board of the foundation, which has sponsored world-wide health and sanitation activities for more than three decades. Selection of Professor Fair for this important post in the international field of public health is indeed a happy one. Not only is he a highly competent sanitary engineer, a distinguished educator and an experienced administrator, but he likewise possesses an unusual background that is international in scope. Not the least of his qualifications rest on his activities as assistant director of the division of sanitation, League of Red Cross Societies in Geneva, Switzerland, following the last war, and most recently, as consultant to the Office of the Coordinator of Inter-American Affairs; in the latter post he has had a major part in organizing the personnel and formulating programs for health and sanitation work in Latin America. We take this opportunity to congratulate the Rockefeller Foundation on its choice of Professor Fair, and we salute him. His selection does honor to the man and to the engineering profession which he so ably represents.

Local Initiative

"IT WILL BE A TEMPTATION to wait to see what Washington does and to expect the federal government to carry many old and new services that can better be furnished at home. This would be the easy way, but it is one of those easy ways that saps both local responsibility and initiative and leads to danger to free government." So said Governor Dewey of New York recently in his annual message to the legislature when advocating assignment of all state surplus funds to postwar reconstruction to "put our state in a position to plan confidently for the future". Because of these accumulating reserves, state highways, public buildings, housing and other works are now confidently being planned on a billion dollar scale. Such planning, without waiting to see what may come from Washington, is in the American tradition and, incidentally, is the way to get things done. Doing things locally that can be done locally and for local benefit is applicable to every postwar planning need.

Topeka Can Point With Pride

PLANNING FOR POSTWAR public-works construction is serious business in Topeka, Kansas, and the job that has been done to date is one that bears emulation. First contact with the report of the authorities at Topeka may be disappointing if you are expecting a fancy brochure printed on special stock and "sugared" with expensive illustrations laid out in accordance with the principles of dynamic symmetry. Somebody remembered the paper shortage and put the entire tabulation on a single sheet of white bond measuring 12x17 in. in size. This must be something of a world's record in listing essential information, for here is what we find: A list of 76 individual projects giving their type, location and total cost, as well as detailed data on the status of financing, planning, field work, legal preparation, right-of-way or site acquisition, total time for preparation, employment possibilities and legal authority. At the bottom of the page are appended "seven basic principles developed by the Topeka authorities as an aid in determining the priority of individual projects." Two of these principles indicate precisely how realistically these postwar planners in Kansas view their job. They are: (1) With the exception of public-road funds, federal funds will

not be accepted except for an extreme emergency; (2) Modern equipment will be used on all construction jobs in preference to made-work by hand labor. It should be mentioned that most of the Topeka projects show "Finances ready now", and virtually all of them can be fully prepared for execution in a period not exceeding three months. Here is an achievement in postwar planning to which any community can point with pride.

The St. Lawrence Again

BEFORE CONGRESS ADJOURNED in December the President urged upon it the desirability of making provision for an early start on the St. Lawrence seaway and power project. More recently Governor Dewey of New York recommended to the legislature that the state undertake the work in cooperation with Ontario if the federal government is unable or unwilling to undertake it.

In 1941, when the President urged that the project be undertaken as a war measure, this journal opposed it on the ground that neither the power or the seaway could be ready in time to be of any real service to the war effort, hence men and materials used on construction would actually be taken away from the war effort (*ENR* May 21, 1941, vol. p. 823). Now that planning is being turned toward finding useful projects that could be put under construction in the postwar era, the St. Lawrence project deserves serious consideration. That consideration, however, needs to be complete and realistic, not a blind acceptance of the hastily drawn agreement with Canada that was laid before Congress in 1941, nor adoption of the seaway plans that were made part of that agreement just because they happen to be available. Before actual construction can start there is ample time for a revision of the agreement with Canada and a restudy of physical plans for the seaway.

The 1941 agreement with Canada is defective in that it calls for no change in the present unequal division of water diverted for power above Niagara Falls, a change that should be made in recognition of changed conditions or future possible changes, especially our reduced diversions at Chicago, which were tacitly recognized in the 1909 treaty. Also, a new treaty or agreement should make Canada's continued larger diversion contingent on the export of an equivalent amount of power.

There also is good reason to question the adequacy of the 27-ft. channel depth for the seaway included in the 1941 agreement. Dimensions of ships built since the war began have not been made public, but most of the cargo ships and tankers under construction when this country went into the war had salt-water drafts of more than 27 ft., which means that none could navigate the St. Lawrence seaway under a full load. If the seaway is to be built, it should be designed to accommodate the great fleet of new ships we have built as a war measure.

These two subjects need thorough consideration by Congressional committees before any new agreement or treaty with Canada is approved.

No Wartime Conventions

A NEW AND MORE DRASTIC ORDER against holding conventions goes into effect on Feb. 1. No meeting can be held unless it can be shown to the satisfaction of the Office of Defense Transportation that the war effort *will be retarded* if the convention is not held. That would seem to rule out all national meetings and most regional meetings except those of local sections of national societies that require no railroad travel or hotel lodgings. Looking back at the almost complete failure of the voluntary cancellation plan of last year, it is to be hoped that the ODT will be adamant when it comes to review the applications already being filed for permission to go ahead as usual. If one association gets the go-ahead signal, others will petition for similar treatment and the whole plan will fail, just as did the voluntary system in 1944.

Curtailment of conventions cannot be regarded as a serious detriment to dissemination of new knowledge if those who normally would appear on such programs will prepare similar material for publication in society proceedings and the technical press. Smoke-filled convention rooms, the distractions resulting from people moving in and out or talking in monotones, and fatigue from attempting to absorb too much at one time are disadvantages of conventions. On the credit side there is an opportunity for renewal of friendships and for discussion of the papers.

Get-togethers of professional men are desirable in normal times, but the problem of the moment is to restore normal times.

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AN ENGINEERING NEWS-RECORD FOREIGN REPORT

U.S. War Construction in Britain—Invasion Aftermath

Waldo G. Bowman
Editor, Engineering News-Record
(By air mail from the European Theater of Operations)

● This is the first report from Mr. Bowman, who is now in the European theater to obtain information on military engineering and construction operations. En route to the battlefronts he stopped in Great Britain to observe what the U. S. Army Engineers there are doing. The following account deals with the activities of combat engineers in civilian rehabilitation work, the maintenance of airports and the engineering tasks involved in moving troops to France.

IN THE SUMMER OF 1943, a year before the invasion, our military engineering forces in the European Theater of Operations were occupied in the vast preparations for that historic military operation. Last summer they played valorous and prominent parts in the invasion show itself, after which they paced the race across France with their steel treadway and Bailey bridging and their mine-lifting, pipeline laying and port repair work. Today, the Engineers are in the vanguard of the great slugging match that is to determine how soon the next, and perhaps the outstanding, engineering task of the war—crossing of the Rhine—is to be made.

Associated Press Photo.

About 2,500 U. S. combat engineers, temporarily stationed in Britain for additional training before proceeding to France, are being employed to assist in the building of emergency shelters for bombed-out Londoners. Assigned to this work are three battalions of 605 men and 27 officers each, plus about 500 specialists, such as plumbers, painters, glaziers, roofers, cement finishers, bricklayers, carpenters and electricians.

I was privileged to see and report on much of the first phase, and this dispatch constitutes a beginning of a similar series of reports on current activities, with possibly some recapitulation of the invasion preparations and of the post-invasion construction that has inevitably followed. It is written in London after several days of visits to U. S. Engineer operations in the British Isles, or in Army terms, the U.K. (United Kingdom) Base, while awaiting transport to France.

By coincidence, the same troopship that brought me over nearly eighteen months ago was again my means of transport, a fact that made the contrast between the two passenger lists doubly sharp. On the earlier trip the Engineer officers and troops aboard were parts of general service regiments and engineer aviation battalions coming over to build airfields in England, which were to be our first stepping stones into Germany. This time my Engineer shipmates belonged, for the most part, to combat groups; only incidently were the majority of them interested in any substantial types of construction, rough but effective facilities to aid destruction being the object of their assignments.

On the earlier crossing, too, there were hundreds of pilots to man the planes that would fly off the Engineer-built fields, but on this trip the same accommodations were occupied by doctors, nurses and badly-needed general hospital units. No longer are we getting ready for war; this is it, and the penalties are beginning to be assessed.

These Engineer Combat Groups are interesting outfits—used for the first time in this war. The purpose behind their origin was to make available more skills than could be supplied by the old style combat regiment, and at the same time to achieve a flexibility that would promote a more efficient use of manpower than was possible with a regiment consisting of two fixed battalions. In the Engineer Combat Group the only fixed component is the headquarters staff, consisting of 17 officers and 64 men. When the Corps, to which the Group is assigned, gives it a job to do, this headquarters does all the planning (and design, if any), and then the various types of special units at its disposal are called in. Usually there are four or five battalions and a number of special companies, say dump truck, bridging, topographic, heavy equipment etc. And, of course, the group may, and probably will, be handling a number of different jobs at once.

Flexibility key to group organization

Thus the group can be "tailor-made" for any mission that is handed it. The setup has been likened to a general contractor-subcontractor arrangement, the headquarters nucleus being the general, and the battalions and companies the specialist subs who are called in when needed. Without question, the group idea (which incidently is also applied to general service regiments) provides the sought-after flexibility and wide use of special skills; it may, as sometimes charged, make difficult the development of unit pride and esprit de corps that is one of the strong points of the old regiment organization, but the solid achievements already chalked up by the groups indicate that the fault may not be a serious one.

Such units, of course, would seem to be destined for the continent, which might suggest that the U. K. Base is washed up as a vital element in the chain of supply or as a site of engineering and construction activity. No impression could be more erroneous. Maj. Gen. Harry B. Vaughan, commander of the U. K. Base, who will be remembered as District Engineer at Philadelphia just before the war, is almost as busy as his predecessor and present boss, Lieut. Gen. John C. H. Lee, deputy commander, European Theater of Operations, was before the invasion. And the high pressure requirements extend right down the line to Col. C. H. Chorpenning, chief of staff to General Vaughan and to the U. K. Base Engineer, Col. W. D. Luplow and his chief of construction, Col. C. J. Barker.

Where sections of old runway pavements have to be replaced an improvised pavement breaker is used to break up the surfacing (top) and the broken material is removed by a skimmer before the new surfacing is placed.

In the U.K. before the invasion there were more than two dozen engineer aviation battalions to construct and repair the airfields of our Air Forces; now there are only a few. Then there were general service regiments galore; today the bin is about empty of such skilled manpower, which incidently posed a problem when we offered to detail some American troops to help build emergency shelter for bombed-out Londoners.

The solution of this rehabilitation problem has been to use combat engineers temporarily stationed in the U.K. for additional training before proceeding to France, and they are proving to be unusually effective at a job quite foreign to their previous experience. Of the two types of work required—first aid repairs to houses and flats, and the erection of prefabricated huts—the men are less efficient at the former since it involves such skills as plumbing, roofing, carpentry etc. Clearing debris from bombed sites with bulldozers, loading it with ½-yd. shovels into trucks for disposal, constructing rough foundations and concrete floors, and assembling the prefabs is more in

Strengthening old pavements often is necessary. Shown here is a paver adding 6 in. of new concrete to an old perimeter track.

Pouring an edge of concrete along a runway of pierced steel plank at a point where an intersecting runway will cross. Note the mobile mixing plant, a 14S mixer and water tank mounted on a standard trailer unit, with cement and aggregate on the towing truck. This unit can get out of the way of planes much faster than a paver.

keeping with their capabilities, and more to their liking too.

The British Ministry of Works and the British public generally have accepted this gesture of good intent on our part with much appreciation; more perhaps than it deserves, since the 2,500 or so troops we have been able to spare compares with upwards of 125,000 civilian construction workers on the same job. The magnitude of this job can be measured by the following official figures relating to flying bomb and rocket damage during the first four months after D-day: Destroyed or damaged beyond repair, 27,000 housing units; damaged and rendered uninhabitable, 54,000; and damaged but susceptible of first aid repair, 1,039,000. Our prefab jobs attempt to replace some of the 27,000 destroyed homes, a total of 600 on 25 sites being the present program, which was started on Dec. 9.

The American forces doing the work consist of three battalions of 605 men and 27 officers each, plus a certain number of specialists (500 according to plan) attached to each battalion and drawn from units all over the British Isles. It has been difficult to assemble sufficient skilled workmen, but of the 500 provided for, it was contemplated that 54 would be plumbers, 104 painters, 4 glaziers, 13 roofers, 30 cement finishers, 111 bricklayers, 173 carpenters and 11 electricians.

As it has turned out, it has been necessary for combat engineers of tender years and no building experience to take on some of these jobs, and they have done surprisingly well. Working right in the heart of a bombed-out area, with families literally waiting to move in out of the cold and dampness of a London winter, the men are wasting neither time nor energy. They will be better combat engineers, and better Americans too, for the experience.

Big airfield maintenance job

When one thinks of our forces as having moved over to France, he is forgetting the Eighth Air Force whose bombers and fighter escorts still work out of the same airfields in England that our Engineers built for them in late '42 and '43. And so constant have been their operations that a huge job of airbase repair and maintenance has fallen to the U. K. Base Engineer, and to one of his district engineers, Lt. Col. H. M. Salley, and the skeleton forces at their disposal. Moreover, the concrete runways, perimeter tracks and hardstands were built in haste, and often in the wet 1942-43 winter when base stabilization and drainage were impossible, with the consequence of numerous serious faliures. Not only repair, therefore, but virtual reconstruction is required in many cases.

Pavement damage or a bomber field is concentrated in two places—the ends of the runways where the heavily loaded ships congregate prior to takeoff, and the perimeter tracks where they taxi slowly with their wheels always on the same narrow strips of pavement. In both cases break-up of concrete occurs when (1) the foundation is inadequate; (2) the concrete is poor; or (3) the slab is not thick enough to take the loads. One of these shortcomings is almost bound to crop up on every field, and sometimes all three are encountered.

On our bomber fields, both runways and perimeter tracks are 6-in. slabs and infrequently 8-in. Patching the breaks in the slabs was tried, but

was found to be an endless operation, and generally unsatisfactory because it interferred too much with plane operations. Now the solution is to close a runway for several days while it is being topped with tar or asphalt macadam, 3½ in. thick at the ends and and 1 in. elsewhere; and to overlay perimeter tracks with an entirely new 6-in. slab. Some idea of the magnitude of the program is gained from the fact that nearly 4,000,000 sq. yd. of black top and 2,000,000 sq. yd. of concrete were in the 1944 program.

Originally the asphalt paving and the concrete slab work were done by both troop and civilian labor, but approximately six month ago a division was made. Civilian contractors, sometimes using troops' equipment, were detailed to do all of the asphalting, at they were more adept at it and it could be stopped at any time without making the airfield unoperational. The concrete work, however, is now done by the battalions. Since it usually demands continuous operation the troops are better able to work on a 24-hour schedule. Concreting is a paver operation by the troops, and differs only slightly from original construction. Very little base preparation is done for either type of surfacing, the old concrete being broomed clean and little else. One little task, not encountered on new work, is required on the concrete overlay jobs, where the form stakes have to be drilled into the old pavement rather than being driven into the ground. But there can't be much refinement or care exercised because the objective is to deny the use of a runway, perimeter track or hardstand to the bomber for the minimum possible time.

Patching proved inadequate

In the early stages of the work when it was thought that patching would provide sufficient repair, an ingenious, fast-moving paving plant was developed consisting, as shown in one of the accompanying illustrations, of a water tank and a 14-cu. ft. mixer mounted on a standard trailer. Pulled by a truck carrying cement and aggregates, the unit could get onto a patching job very quickly. In the meantime, a British-make truck-mounted pavement breaker and a skimmer scoop had removed the shattered concrete from the patching area so that the concrete could be poured quickly, and the mixer unit speeded out of the way. Patching, however, proved inadequate so that the mobile mixer units are now used only for odd jobs; one of these units, pouring an edging slab along a pierced plank runway to provide a transition to an intersecting runway, is shown in one of the accompanying illustrations.

Fighter plane fields also provide the Engineers with problems and jobs. Many of these installations have only a grass surface on which pierced steel plank has been laid for runways and hardstands. Wet winter weather softens the earth, with the result that its bearing power is lowered or lost, and what is particularly disagreeable on hardstands, the mud pushes up through the holes so that the mechanics have to work on a slimy, slick surface.

One common and effective repair method is to remove or roll back the steel plank, place and compact a 3-in. layer of dry-mixed gravel and cement and cover it with about 3-in. of straw. When the pierced plank is replaced it

New techniques for laying steel mat are being developed with experience under difficult field conditions. Where mud conditions are bad, a base of 3 in. of dry packed aggregate to which a small amount of cement has been added is spread over the surface. Three inches of straw then are spread on the aggregate before the mat is laid.

Where the underlying material is found to have insufficient stability for continued use, the steel mats are rolled up to permit surface stabilization. Tow lines are hooked into the mat, as here shown, to do the rolling.

Flexboards, designed originally to build plank roads on the invasion beaches of France, are proving useful to make hardstands for airplanes. When the flexboards are laid they are secured to the ground by driving hooked pins down over the pipe bar at the end. Joints then are filled with asphalt.

rests on a new, solid foundation, protected from the weather by the straw. And should the foundation get soggy anyway, the straw keeps the mud from working up onto the plank surface. New pierced plank runways are also being laid in this manner.

Flexboards for hardstands

An alternative to this method of lifting pierced plank hardstands out of the mud is to replace them with timber platforms made from some special prefabricated panels out of which the British had planned to fashion planked roads on the beaches. Known as Somerfeld flexboard, the units are 3 x 9 ft. in area, made up of pieces of 1¾-in. scrap lumber held together by a pair of iron straps entirely encircling the assembly. Through the loops formed by these straps at the ends of the units, a 3-ft. long bar is inserted to join the units into flexible strings; long dowels driven into the ground through holes in the bars are used to hold the units down.

In making a hardstand, as many of these strings as required are placed side by side, usually on a 3-in. compacted gravel base. A cold-mix asphalt is broomed into the joints between the units and between the strings, so that the result is a continuous surface free from mud and easy to work on. Some idea of the substantial nature of the platform may be gained from the fact that each flexboard unit weighs 252 lb. So long as the supply of these units lasts it is probable that hardstands will be assembled from them, not only because of their intrinsic advantages but because their use permits the steel pierced plank to be released for use on the continent where it is always badly needed.

Although airfield maintenance requirements give rise to the principal U. S. construction activity in Britain, Army Engineers are still busy at hundreds of odd jobs along the routes to the ports, since the movements of troops and supplies to France, which began with the invasion, have continued ever since. Today it is called "build-up", but the procedure is the same as for the invasion.

The Engineer responsibility for keeping this 'build-up" moving rests on two former state highway department engineers, Lt. Col. Arthur D. Morrell of Nebraska, district engineer, and his chief of construction, Maj. O. J. Eidmann of Kansas.

Prior to the invasion, England, for a distance of about 50 miles in from the coast, was divided into a number of "concentration" areas, each with enough camp facilities to accommodate about a division of troops and its vehicles. Near the ports, i.e., five miles or so back, were "marshalling" areas containing smaller camps, usually large enough to take a boatload of troops and equipment. A division moved into a concentration area, acquired its equipment and waited for word to move. When this came, it was broken up into boatload groups, each of which went to a marshalling camp. A day, or at most two days here, was followed by embarkation.

It was between January and June, 1944 that the Engineers helped the British build the camp facilities in the concentration and the marshalling areas. These consisted of streets, drainage structures of emergency types, and Nissen huts for mess, headquarters, latrine, dispensary and sometimes living quarters, although generally the latter were established in pyramidal tents. Large parking areas had also to be provided since our troops average a vehicle for every 4 to 7 men. Often these vehicle parks were placed in fields, but frequently hardstands were built on the shoulders of the roads. Literally dozens of such camps had to be set up and virtually operated as hotels, since the troops moving through did none of their own cooking and general housekeeping.

Tanks for vehicle waterproofing

One interesting facility in each marshalling camp was a tank in which the waterproofing of the vehicles could be tested to make sure that they would reach the beach when they were rolled off the LCT into the surf. In one case a stream was dammed to form a tank, but at other sites they were built of concrete to provide a 5½-ft. depth of water, with a ramp at either end for entrance and exit. In order to make the test realistic, the vehicle had to be driven into the tank through a simulated LCT made out of cloth fastened to wood frames. The deep water also made it realistic, particularly for the jeep drivers who had to stand up in their vehicles, which were entirely submerged except for the fittings on top of the windshield.

Some of these facilities have now been turned back to the British or shut down, but those that are still in operation have had to be winterized. For the huts this means principally

the installation of stoves, but in the tents concrete floors have had to be laid, fibreboard walls, waist high, have had to be built and wooden door entrances installed. The drainage ditches are also in need of constant attention as the winter rains increase.

Beach ramps of precast units

Another preinvasion Engineer job of note, and also one that was done in company with the British, was the building at the ports of the socalled "hards" or paved beach ramps over which the landing craft were loaded. Contrary to general belief these are not poured slabs, but consist of precast concrete units known as chocolate bars in deference to their scored checkerboard surface. Averaging about 10 in. thick, each unit is about 2 x 3 ft. in plan. Laid on a sloping beach the units are wired together, and provide a strong flexible pavement. Both surfaces are deeply scored so that the units may be placed either side up. The top surface gives a high non-skid efficiency for the vehicles, while the bottom bites into the beach and helps to hold the units in place. In one or two instances rails have been laid down the hards so that freight cars can be loaded, but for the most part they are planned for highway vehicles.

Hospitals and leave camps

Since D-day, too, two fair-sized construction jobs have had to be carried out, both relating to men returning from France. One is the conversion of camps into general hospitals for the casualties, while the other, just nearing completion, is the building of a "leave" camp at one of the ports for soldiers on furlough. The latter, built in cooperation with the British Royal Engineers, consists of a colony of Nissen huts enclosed with brick ends, lined with insulation board and set on concrete floors.

For the hospitals, camps with huts rather than tents are usually chosen, although winterized tents serve very well when required. One of the principal jobs at the hospitals is the construction of enclosed or covered corridors to connect the various buildings, particularly the wards with the kitchen, operating rooms and administration offices. Brick walls and corrugated asbestos roofs are used, or if walls are not required precast concrete bents carry the roofs, which are supported on beams of cement-asbestos pipe.

Officers inspecting an aircraft "standing" surfaced with "flexboards". Left to right, Major Jack E. Stenberg, battalion commander; Lt. Col. Henry M. Salley, district engineer; Capt. Robert E. Burns, battalion engineer; and Capt. Charles H. Snyder, company commander.

There is, of course, a good deal of interior partition work to be done in the huts, and it is always amazing to recall after these partitions are in that the basic structure is just a 24-ft. corrugated steel arch building. When the rooms are furnished with such things as operating tables, X-ray equipment, anasthesia machines and great dome lights, the ancestry of the building is completely lost.

Artificial invasion harbors

No review of invasion construction would be complete without some reference to the artificial harbors that were set up off the coast of Normandy. There seem to be many different opinions respecting their effectiveness, but none that casts a shadow on the high order of engineering involved in their design, construction or installation.

The bulk of the credit goes to the British, but our Navy Seabees had a considerable part (as the article in *Engineering News-Record* of Dec. 28, 1944, vol. p. 823, makes clear), first in planning the general installation of the breakwater and bridge units and then in building the American harbor in record time only to have it wrecked by a storm before it could be put into use. Also the Army Engineers constructed some of the Phoenixes (the concrete caissons) along the British coast; our top Engineers in ETO were in constant consultation with the British, and some of the hydraulic check testing on models was done at the Waterways Laboratory of the Army Engineers at Vicksburg, Miss. Even at the very inception of the scheme, way back at the Churchill-Roosevelt Quebec conference, three Navy Civil Engineer Corps officers and three Army Engineer officers worked with British engineers for two weeks in Quebec and Washington perfecting the basic design of the harbor elements. Every day one hears of some new angle of this immense undertaking, or of some new group that worked on it.

The complete history of Mulberry and Gooseberry, the code names of the harbor for deep and shallow draft vessels respectively, will make fascinating reading for engineers and construction men for years to come. In the meantime, much can be learned (by those fortunate enough to be in London) from a very fine exhibition of photographs, models, maps and dioramas of the harbors set up in several rooms at the Institution of Civil Engineers. It is, as some visitor was heard to remark, "quite the best show in town."

Reconditioning Concrete Floors To Carry Heavy Warehouse Traffic

Contents in Brief: *Maintaining a smooth and dust-free surface on concrete floors subjected to the traffic of steel-tired warehouse trucks is a constant problem. The Repairs and Utilities Branch of the Office of the Chief of Engineers of the Army have developed methods of resurfacing trucking-aisles with concrete and with asphalt mastic as well as procedures for hardening concrete surfaces to prevent "dusting" under traffic. Instructions to engineers concerned with such maintenance has been compiled under the title "Toppings and Treatments for the Correction of Concrete Floor Deficiencies" from which the following is extracted.*

HEAVY LOADS and large volumes of warehouse traffic, moving on steel wheels, frequently damage concrete floors, necessitating replacement or resurfacing of some areas. Such repair may be accomplished by use of cement-mortar concrete 2 in. or more thick, as an inlay, flush with the existing surface; or by placing a minimum of ½ in. of asphalt mastic on the existing surface as an overlay.

Local conditions determine whether concrete or asphalt mastic will be more satisfactory for a given location. For example, floors subjected to considerable oil dripping should not be surfaced with asphaltic materials. The use of concrete as an overlay topping for limited areas, such as trucking aisles, is not recommended. Also, use of concrete requires that the area be kept clear of traffic for several days during the time required for preparation of the floor and while the new surface hardens and attains some degree of curing.

The first step in resurfacing with concrete is to cut out the defective surface to a minimum depth of 2 in. (It may be desirable to remove the slab down to the subgrade, in which case any disturbed fill should be carefully settled and tamped.) The edges around all cut-out areas must be kept vertical and as straight as possible. The entire defective area should be included with no attempt made to reduce the repair work by leaving small "islands" of the original surface. Final dressing of the edges by hand chiseling or chipping hammer is desirable to avoid any feather-edging along the joint lines. It is important, of course, that all dust, dirt, loose particles and debris be removed from the cut by vigorous brooming, air blast or other suitable means.

The prepared surface should be thoroughly saturated with water not less than four hours prior to placing the concrete inlay. One to two hours immediately preceding the placing of the topping all surface water should be removed with a mop so the top

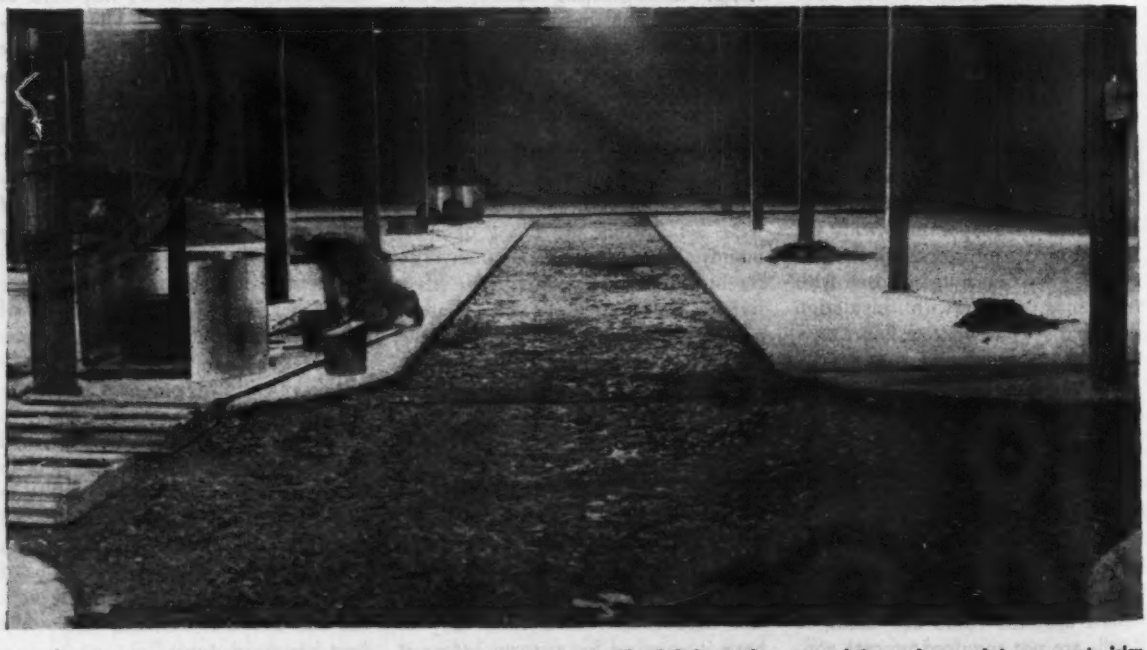


Fig. 1. Defective surface of concrete runway cut out to a depth of 2 in. and prepared for a heavy-duty concrete inlay.

will be in a surface-dry condition. (Where the old slab is removed down to the fill, a layer of saturated felt or water-proof building paper should be used in lieu of the wetting.)

A cement-paste slush coat consisting of cement and water mixed to the consistency of thick cream should be applied and brushed well into the surface with a broom. Excess cement paste should be removed and the amount of cement left on the surface should be barely more than that required to give the surface a uniform cement color.

High quality concrete

Normal portland cement, with 2 percent cement by weight of calcium chloride added, or high-early-strength cement may be used. Aggregate should be quartz, trap rock, granite or material of equal hardness capable of meeting the Los Angeles abrasion test. It should be of exceptionally uniform grading in both the fine and coarse aggregate and no material should exceed that which will pass a ⅜-in. sieve.

Recommended proportions for floor inlay concrete are 1:1 1/3:2 with a total mixing water content, including free water in the aggregate, not to exceed 4½ gal. per bag of cement for hand finishing or 4 gal. for machine finishing.

The proportions given will result in a fairly harsh mix that will require more than ordinary finishing effort. Such a mix is necessary, however, to obtain minimum shrinkage with a good wearing surface. If the nature of local materials is such that the above proportions yield a concrete that is too harsh to obtain a satisfactory finish, the proportions might be varied to approximately 1:1½:1½.

Batches of concrete should be mechanically mixed for a minimum of 2 to 3 min. After placing, the concrete should be firmly vibrated, rolled or tamped into place. Where tamping is used a grill type tamp is recommended, which can be made by nailing strips ¼ in. wide and ½ in. deep, spaced about ⅜ in. apart, on the face of a regular tamper. The concrete should be screeded to designated levels, then floated with a wood or power float, the latter being recommended.

Final smoothing of the surface should be done with a steel trowel, applied after the concrete is sufficiently hard to resist indentations made with the fingers. Dusting of dry cement or cement-sand mixture or the sprinkling of water on the surfacing should not be permitted under any circumstances. Care also should be taken that the finishing does not bring excess fines to the top. It should be expected that this type of concrete surface will require more work than conventional finishes and provisions should be made for the extra labor involved. Expansion joints through the concrete below or from adjacent blocks of concrete should be continued through the new work.

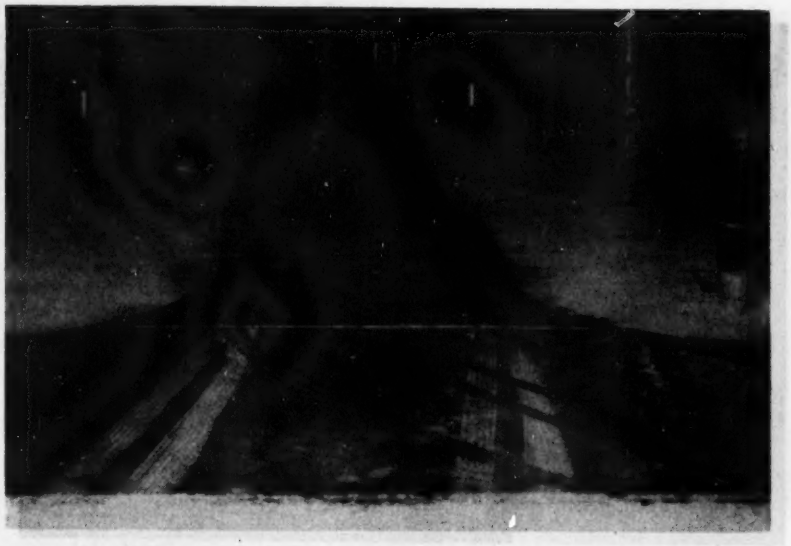


Fig. 2. Completed concrete inlay (wheel tracks show in curing compound). Note expansion joints in new work, in line with building columns.

The concrete should be protected from rapid drying by use of a curing compound or other means, applied as soon as the surface is sufficiently hard to prevent marring. The inlay concrete floors may be used after three days if made with high-early-strength cement and cured at temperatures above 45 deg. Loads should not be put on standard cement patches for seven days.

Heavy-duty mastic topping

Asphalt mastic for use as an overlay in resurfacing existing floors should be a combination of portland cement, asphalt emulsion, water and sand with optional addition of suitable stone aggregate. The mastic topping should be a minimum of ½ in. thick with the free edges feathered and, when ready for use, should be a tough, resilient and dustless composition, highly resistant to the abrasive and shock action of warehouse vehicles.

Concrete floor surfaces to which mastic topping is to be applied should be cleaned of all dust, dirt and foreign particles by vigorous brooming, air blast or other suitable means. Oil and grease spots should be removed by application of a hot solution of 1 gal. of water to which ¼ lb. of common household lye or trisodium phosphate is added. The cleaning solution should be allowed to soak in for perhaps ten minutes while being scrubbed with a stiff bristle fiber or wire brush. The spot should then be flushed with water and mopped until both spot and cleaning compound are completely removed.

While the cleaned floor is still damp, but not wet, an asphalt emulsion primer should be applied in two coats. Recommended procedure is to dilute the primer with about 20 percent clean, cool water and scrub over the entire surface, using not less than 1½ gal. per 100 sq. ft. of surface. After it becomes "tacky dry," the second coat of primer should be applied, full strength, at not less than one gallon per 100 sq. ft. of surface, and again allowed to become tacky dry before placing the finish mastic topping. To improve the mechanical bond the second prime coat may be composed of one part primer to one part of sand, thoroughly scrubbed over all surfaces.

Desirable mixes for both hand and

Fig. 4. Asphalt mastic is spread roughly between screed strips, struck-off with a straight-edge and then hand trowelled to a smooth surface.

machine preparation and application are shown in the accompaning table. In mixing by hand, measured volumes of cement and sand (and coarse aggregate when required) should be thoroughly combined while dry. Sufficient water to make a heavy mortar should then be mixed in and finally the emulsion added and mixing continued until the entire mass is a uniform black.

For Mixture No. 3, the use of a batch, rotating-drum type of concrete mixer or mortar mixer, (stationary, tilting open-top drum with revolving blades) is recommended. A mixing time of four to five minutes generally is sufficient to produce thorough mixing of a cubic yard batch.

Screed strips, ½ in. or more in thickness should be placed on the concrete floor to control areas and depth of topping. After the material has been rough placed, it should be leveled up with a straight-edge strike-off board. After initial set has taken place, the topping should be wood floated to remove high spots and fill depressions. Initial set may be expected within four to five hours after installation and final set in about twelve hours.

The installed mix may be "densified" by use of a tamper or roller or both. The tamper may be of perforated steel plate or heavy wire mesh, two meshes to the inch. The roller should be about 30 in. wide and weighted to not less than 10 lb. per inch of width. For tamping or rolling, the mixture should have attained sufficient strength to resist being picked up by the tamper or showing footprints following the roller. A power float machine should always be used on application of Mixture No. 3 and may also be used on Mixtures 1 and 2, except on feathered edging where hand troweling is required. Steel troweling following the tamping, rolling or power floating may be used beneficially to give a smoother surface.

Finished topping should be kept damp, by any suitable method, for about twelve hours, as too rapid drying may result in checking. The surface may be used for all kinds of trucking as soon as the final set has taken place, which usually occurs in about twelve hours.

Proprietary materials

Several manufacturers are prepared to furnish, either direct or through agents, heavy duty mastic topping materials and primers designed for application on concrete floors. Total cost of material and labor will vary from about 12 to as much as 25c. per sq. ft. depending on the materials used, thickness of covering and the like.

Dusting of concrete floors can be retarded by application of low viscosity liquid hardeners capable of deep penetration into the concrete. The hardeners add considerable surface resistance to the abrasion and shock action of warehousing vehicles. Hardeners usually are of the sodium silicate (water glass) type, commercial grade 40 to 42 deg. Baume; or magnesium fluosilicate, crystalline salts plus zinc fluosilicate.

The materials are simple to prepare. Sodium silicate requires only dilution by addition of water in a ratio of 4 gal. of water to 1 gal. of the sodium silicate added immediately before using. The magnesium fluosilicate solution should consist of 1 gal. of fresh clean water to which is added 2 lb. of crystalline salts of

MASTIC TOPPING MIXES FOR REPAIR OF CONCRETE FLOORS

For hand mix and finish		Machine mix and finish
Mixture No. 1 With coarse aggregate	Mixture No. 2 Fine aggregate only	Mixture No. 3
1 bag portland cement (1 cu.ft.) 15 gals. asphalt emulsion (2 cu.ft.) 2 cu.ft. sand 3 cu. ft. coarse aggregate	1 bag portland cement 15 gals. asphalt emulsion 3½ cu. ft. sand	1 bag portland cement 15 gals. asphalt emulsion 2 cu. ft. sand (torpedo type) 6 cu. ft. coarse aggregate
Covers 120 sq. ft. ½ in. thick	Covers 100 sq.ft. ½ in. thick	Covers 170 sq.ft. ½ in. thick

magnesium fluosilicate and zinc fluosilicate, with not less than ½ lb. of the salt being zinc fluosilicate. The fluosilicates may be obtained as prepared solutions or as dry crystals, the latter being considerably more economical. The crystals can be mixed at the job with a measured amount of fresh water, using a wooden vessel of suitable size.

The concrete floors to which a liquid hardener is to be applied should be cleaned of all dust, dirt and foreign particles and oil or grease spots removed as suggested previously.

Proper method of application for sodium silicate hardener is to spread the liquid with a mop or broom and brush continuously over the floor surface to assist in obtaining an even penetration. At least 24 hr. should be allowed for the first coat to dry and harden. The glaze, which generally appears on the dried surface, should be removed by scrubbing with hot water prior to succeeding applications. After the surface is allowed to become completely dry, a second coat should be applied, allowed to dry and again scrubbed with hot water. After another 24 to 48 hr. a third coat should be applied. No hot water scrubbing is desirable after the last application.

The magnesium fluosilicate solution described heretofore should be applied with a mop or broom and brushed continuously over the floor surface for several minutes to assist in obtaining an even penetration. For the first coat, the solution should be diluted by adding fresh clean water in the ratio of one gallon of water to one gallon of the solution or, a first coat solution may be made using one pound of dry crystals for one gallon of water. After allowing at least 24 hr. for drying, a second coat of the fluosilicate solution should be applied. If the floor is unusually friable or porous a third coat of the full strength fluosilicate solution should be applied after a drying period.

Hardeners are low in cost

One gallon of sodium silicate, diluted as described, may be expected to cover about 800 sq. ft. of floor surface with one coat. Total cost per 100 sq. ft. for three coats should not exceed 75c. for labor and materials. One gallon of magnesium fluosilicate may be expected to cover about 100 sq. ft. of surface at a cost for two coats of about $1.10 per 100 sq. ft.

In general, laboratory experiments and actual use have shown little difference between the efficacy of water glass and fluosilicate, if both are applied properly. On smooth troweled floors or dense surfaces there may be some advantages in using the fluosilicate treatment instead of the sodium silicate due to lower viscosity of the fluosilicate and its greater penetrating ability.

The penetration of most hardeners, especially sodium silicate, can be improved by applying the solution hot (approximately 170 deg. F.). In some recent tests the viscosities of the liquid hardeners were found to decrease markedly with increased temperature. The relative viscosity of the sodium silicate solutions and also the fluosilicate solutions at 170 deg. F. were less than one-half their respective values at 70 deg. F. This represented a much greater change in viscosity than was obtained by increasing the dilution of the solutions as is sometimes recommended for the first coat. For instance, changing the concentration of fluosilicate solutions from 2 lb. per gal. to 1 lb. per gal. reduced the viscosities less than 10 percent. Similarly, reducing the concentration of sodium silicate solution from 1:3 to 1:4 proportion decreased the viscosity only about 10 percent.

Thus it appears that application of a hot first coat will effect penetrability more favorably than diluting the hardener to the extent called for above, but this has not yet been verified by field application. It also is indicated that application during hot weather or in heated buildings will be more favorable to penetration of the hardener than application on a cold floor.

Maximum penetration of the hardener may not always be desirable. On rough porous surfaces it may be more effective to retain the hardener at the surface to supply adequate "reinforcement" rather than to obtain penetration, as is necessary on smooth troweled surfaces.

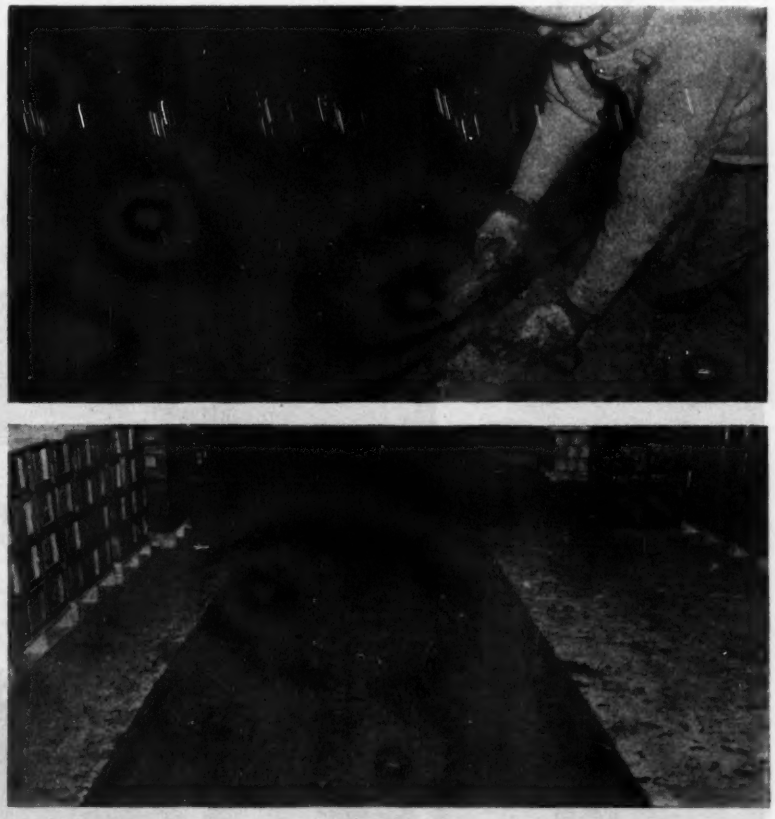


Fig. 5. Edges are broken down for width of trowel and "feathered" out to avoid a sharp edge. Below is completed asphalt mastic strip ready for traffic.

Deck-Girder Railroad Bridge Has Earthquake-Resistant Features

Contents in Brief—A Southern Pacific railroad bridge across an earthquake fault in California was designed to prevent the spans from falling off the piers in case severe temblors occur. Any serious track disalignment sets automatic block signals to stop trains.

EARTHQUAKE-RESISTANT design and an automatic device for warning trains in case of earthquake damage, are used in a Southern Pacific railroad bridge that crosses the San Andreas fault in the Pajaro River channel 92 rail miles from San Francisco on the coast route to Los Angeles. When the company found it necessary to strengthen all structures for heavier locomotives it was decided to entirely rebuild this brige, including in the new design some novel earthquake-resistant features.

The new bridge was located close alongside the old one in order to use the old bridge in erecting the new structure and to improve alignment. Girders were selected in preference to trusses because of the greater rigidity as well as the lesser depth. Depth was a factor because the Pajaro River flood flow in February, 1938, brought water level above the lower chord of the old truss. The girder bridge, with no change in track elevation, affords a clear height of 9.8 ft. above the 1938 flood level.

Where the railroad crosses the Pajaro, the river channel for some distance follows the San Andreas fault and the entire central part of the streambed is in material that has been broken and crushed by earlier movements of the fault. To find the best foundation, test borings were made near the old bridge and the site was carefully examined by a geologist. These studies showed that slightly changing the location of the line as well as the span lengths would make it possible to carry the two abutments and one pier on solid rock and that it would be necessary to put only those piers in the stream channel on less substantial footings. These latter piers were built by putting down wooden coffer-dams in which to pour the concrete on pile supports. Under one pier are "rail piles" of a type, developed by the Southern Pacific,

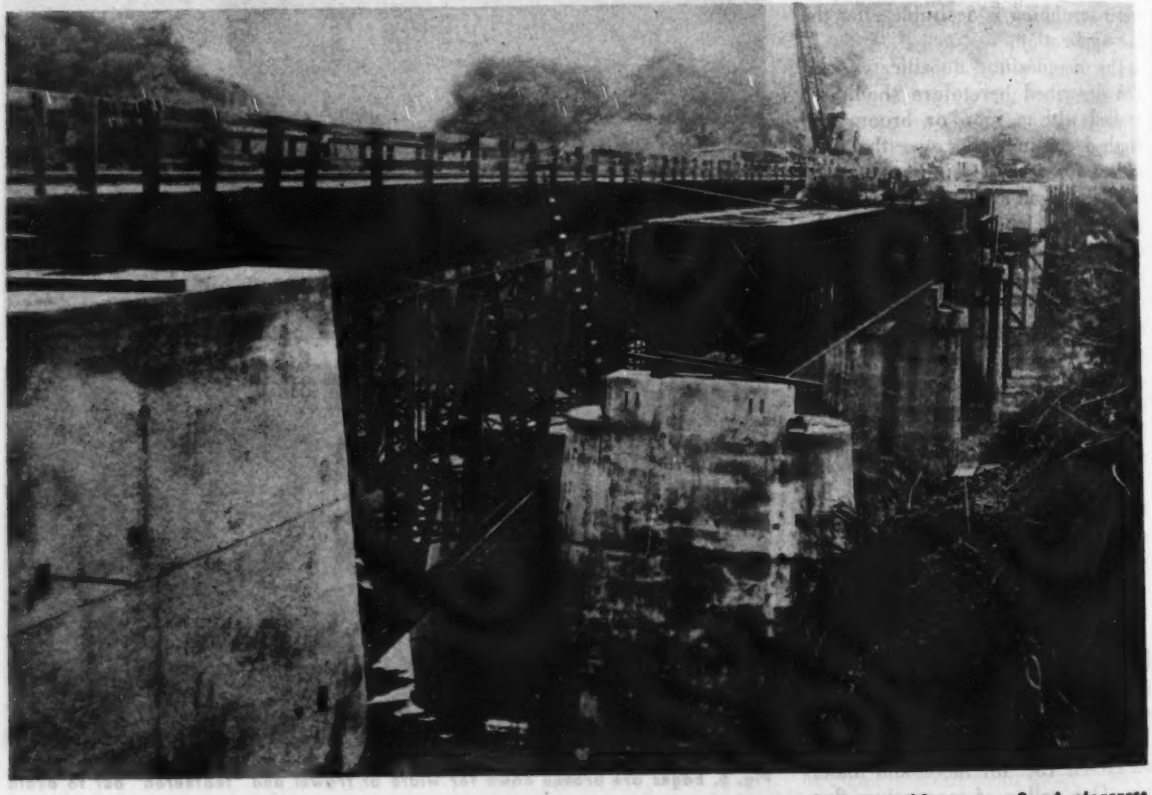


Fig. 1. New plate-girder railroad bridge, built alongside outmoded deck-truss structure, provides more flood clearance.

consisting of three 62-lb. rails welded together ball to ball. With these piles it was possible to reach a rock foundation 29 ft. below the level of pier concrete. The other streambed pier is founded on wood piles cut off at a level such that they are sure to be always submerged.

Continuous bridge has advantages

Instead of separate spans as in the old structure the major portion of the new bridge is a three-span, continuous deck girder. This, with one 86-ft. deck girder span, makes up a 450-ft. total length. The 86-ft. girder was one the company had on hand and its length fitted a location that provided a rock foundation for the pier. The continuous girder design has the advantage, from the earthquake-resistant viewpoint, of continuity over piers in the streambed that might be moved by temblors.

The serious nature of the earthquake risk is shown by the damage to the old bridge in the earthquake of April 18, 1906. The bridge in service at that time consisted of three deck truss spans, each 120 ft. long, flanked on either end by 50-ft. deck girder spans, a total of 460 ft. The earthquake moved all of the piers vertically and all but one horizontally. In some instances the motion was enough to throw the spans off their supports; one span was left hanging precariously on the pier edge.

Permanent horizontal displacement, as measured after the quake, was as much as 3½ ft. on some of the piers. In addition to displacement and tilting, some piers were 0.5 ft. below grade when checked after the movement had subsided. Although the bridge was restored for service as soon as possible after the quake, the fact that it actually crossed the fault made it desirable to include special earthquake-resistant features in the new design.

Special supports on pier tops

With a record of the 1906 damage to the old bridge as a guide, when the new design was made, precautions were taken to prevent the spans from being thrown entirely off the piers. The tops of the new piers were provided with concrete supports on either side of the rocker bearings in the continuous span and with similar safeguards at the abutments. In the pier at the free end of the continuous

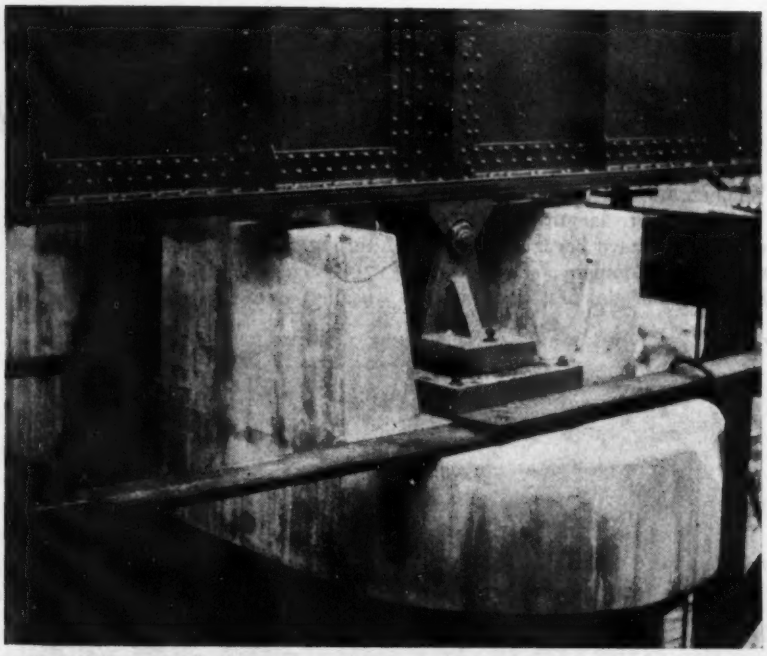


Fig. 2. Concrete projections from pier top are to catch and support girders if quakes disturb pier.

girder a recess was left in the concrete to provide clearance for a reasonable amount of lengthwise movement. At the fixed end the girders were anchored to the pier by plates passing through the back wall with lugs on the far side. Instead of the ordinary type of rocker supports, special rockers were designed, as shown in the illustration, permitting much more freedom of movement than would be needed for temperature changes.

With this arrangement, in the event of a seismic disturbance that moves the normal support from beneath the steel spans, the bottom flange of the girders is expected to come to rest on the concrete projections above the rocker shoes. Thus the dislocated steel would at least remain near its original position and could be replaced and the shoes reset by simple jacking operations.

To take care of the possibility that a disalignment of the bridge produced by temblors might be unnoticed, though sufficient to make the track unsafe for trains, a heavy pendulum was installed on a tripod mounted on one of the piers. Movement of the pier in excess of ¾ in. will cause movement of this pendulum to open a circuit, deenergize a relay and cause the automatic block signals to be set at stop. The abutments and the ends of the girder spans are also connected in the block signal circuit which is opened by any relative movement more than an inch in excess of movements caused by normal temperature changes.

Movement of piers recorded

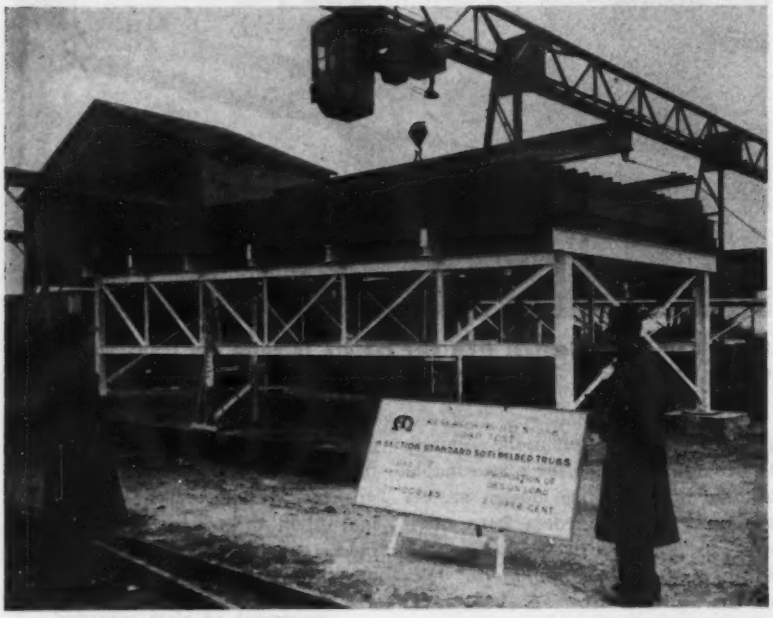
Special markers distinguish the signals both sides of the bridge and trainmen have instructions to make an examination of the bridge to be sure of its safety before passing over the structure. A recording device attached to the pendulum has registered movement of the pier, caused by seismic shocks, as much as ⅝-in. which is only slightly less than the ¾-in maximum that can occur without tripping the signals.

Credit for developing special features of this bridge goes to W. H. Kirkbride, chief engineer, and to George W. Rear, deceased, engineer of bridges of the Southern Pacific Co. when this structure was designed. Details of design were worked out by J. P. Dunnigan, then engineer of structural design, now engineer of bridges; the signal protection system was worked out by R. D. Moore, signal engineer. E. E. Mayo, who was assistant chief engineer when this work was done is now chief engineer, Southern Pacific Co., Pacific Lines.

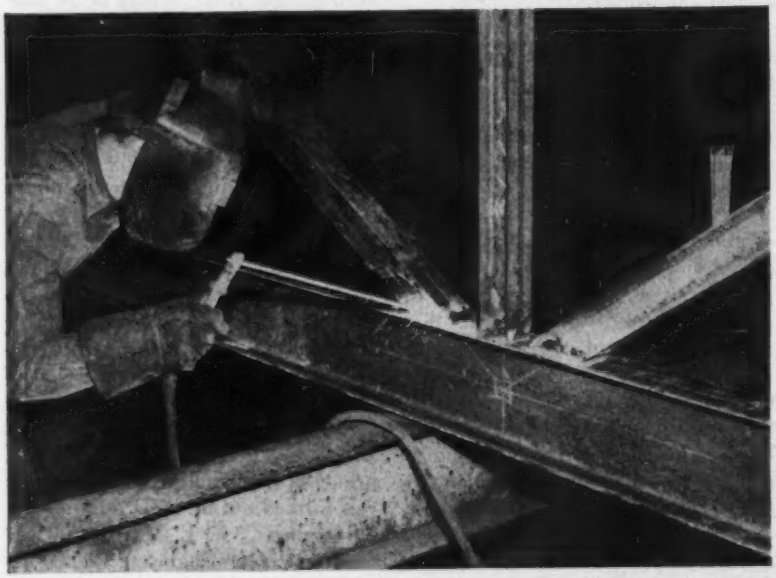
H-Sections Form Standard Length Trusses

WELDED TRUSSES of standard 50, 60, 70 and 80-ft. lengths, simple and economical, have been developed by the Austin Company, engineers and builders. For the first time, according to the designers, H-sections with their webs in a vertical plane are used throughout without gusset plates.

By changing the weights of the beams used for the various truss members, these trusses are readily adaptable to different loadings, and since the depth of the individual members remains constant, no changes in shop details or fabricating jigs are required. Since the top chord is a wide flange beam, it can carry purlins in a variety of spacings without regard to panel points and is also adaptable to continuous uniform loading. Similarly, the bottom chord can carry loads at any point and, if desired, can be used as a monorail.



In tests of the welded trusses, failure occurred by buckling at the vertical web member on the left, at a time when the superimposed load was 240,000 lb., equal to 253 percent of the design load. In spite of the resulting distortion all the welds remained intact.



In fabricating the welded trusses, comprised of rolled H-beams cut to length, web members are welded to the flange of the beam forming the chord.

In the shop the H-sections are assembled in a jig, tack-welded and welding completed with the truss in a vertical position. On a 50-ft. truss, shop fabrication requires a total of 41 lin. ft. of fillet welds all of which is accomplished by down welding.

Because the trusses are fabricated completely from rolled members cut to desired length, no splitting, blocking, slotting or chipping is necessary. Raw cut edges are closed by welds so that only smooth, hard, rolled surfaces are exposed, giving the trusses a maximum of corrosion resistance.

In full size load tests on two 50-ft. trusses of the new design made at the fabricating shops of the Austin Co. in Cleveland more than a year ago, failure occurred under a load that was 253 percent of the design load, at which time an end vertical buckled. Despite the distortion of the trusses when they collapsed, not a single welded connection failed. The behavior of the trusses under a heavy overload was impressive and is attributed in large part to the fact that the line of axis of all members lies in one plane, as well as to the concentricity and symmetry of the end connections of the truss members.

Following this test, trusses conforming to the spans in widest use were designed and jigs set up for their manufacture. During the final quarter of 1944, trusses of this type were fabricated and shipped to plants in five widely separated localities. One of these plants covered an area of 100,000 sq. ft. Experience in the field demonstrated that the new trusses are much stiffer than other welded trusses and that they make steel erection work much safer.

International Waters Allocated Under Treaty with Mexico

V. T. Boughton
Associate Editor, Engineering News-Record

***Editor's Note**—Treaties usually are of no direct interest to engineers; they are concerned with legal questions, and are written and administered by lawyers. Such is not the case with the treaty now before the Senate relating to the rivers in which this country and Mexico have a joint interest. Engineers played a major part in drafting that treaty, it relates to matters of immediate interest to engineers, and if ratified, will be administered by engineers, who will be accorded diplomatic status. The observation might be added that engineers also are found among those who are opposing ratification. For these reasons the following outline of the treaty and review of the arguments for and against it is given the readers of Engineering News-Record in the hope that it may help them to understand and evaluate the discussions of the treaty that are expected to take place in the Senate.*

WITHIN THE PAST FEW DAYS a Senate committee has begun consideration of a treaty with Mexico relating to waters of the Rio Grande, the Colorado and Tijuana rivers that was signed on Feb. 3 of last year, and on Feb. 15 was transmitted by the President to the Senate for its advice and consent to ratification. This treaty is designed to settle long-standing differences of opinion as to the rights of each country to the waters of the two major rivers and to eliminate future controversy over water by defining the source and amount of water that will be available to each country for the use of its citizens. With respect to the Rio Grande, the negotiators of the treaty appear to have been successful in finding reasonably acceptable solutions, but their proposals for the Colorado have met with strong opposition, chiefly from California, the largest present user of Colorado River water.

The treaty is concerned chiefly with engineering matters, water rights, the construction of facilities for the storage and diversion of water for irrigation, flood control and power development, and channel regulation. Engineers had a major part in its preparation. Its principal provisions relate to the two larger rivers, the Rio Grande, which forms the international border from El Paso, Tex., to the Gulf of Mexico, and the Colorado, which forms the international boundary from near Yuma, Ariz., to a point about 20 miles south, from where the river flows across Mexico to the Gulf of California.

One section applies to the Tijuana, a small river which flows through both countries to reach the sea below San Diego.

Article 2 of the treaty entrusts general administration of the treaty to the International Boundary Commission, organized under a convention signed March 1, 1889, and changes the name of the commission to the International Boundary and Water Commission. This commission, the treaty states, "shall in all respects have the status of an international body and shall consist of a United States Section and a Mexican Section. The head of each section shall be an engineer commissioner." The present United States commissioner is Lawrence M. Lawson, and the Mexican commissioner is Rafael Fernandez MacGregor, both engineers. These commissioners are accorded diplomatic status under the new treaty, and their two principal engineers, a legal adviser and the secretary of each commission are to be granted immunities appertaining to diplomatic officers.

Dams on the Rio Grande

Construction of three main storage dams on the Rio Grande is called for in the treaty, but the International Boundary and Water Commission is given discretion to increase or decrease the number upon further study, provided the change is approved by the two governments. One of the storage dams is to be constructed in the section between the Santa Helena Canyon and the mouth of the Pecos River, one in the section between Eagle Pass and Laredo, and a third in the section between Laredo and Roma, Texas. The sites tentatively selected as having the most promising features are indicated on Fig. 1 as the Agua Verde, Palafox, and Falcon. Further investigation of these sites is being carried on.

The commission is instructed to study and prepare plans for flood control work, other than the three storage dams previously noted, along the Rio Grande from Fort Quitman, Texas, (about 75 miles below El Paso) to the Gulf of Mexico. These works may

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include levees along the river, floodways, grade-control structures, canalization and artificial channeling. Each government agrees to construct, operate and maintain such works as may be recommended by the commission and approved by the two governments.

The commission is instructed to study and report on the cost of developing hydro-electric power at the international dams, and if construction of such power plants is approved by the two governments, the cost is to be shared equally, and the power equally divided. Either country may sell its surplus power to the other.

Within the year following the placing in operation of the first of the major international storage dams, the commission is to submit to each government for approval regulations for the storage, conveyance and delivery of waters of the Rio Grande from Fort Quitman to the Gulf of Mexico. Such regulations may be modified when necessary, subject to the approval of the two governments.

The treaty sets forth the general rules that are to be observed in storage and discharge of water to be handled through the international storage reservoirs.

Use of the river

The channel of the Rio Grande may be used by either of the two countries to convey water belonging to it. Either may divert water belonging to it at any point on the main channel below Fort Quitman, and may construct the works necessary for such diversion. However, no such diversion or use, not existing on the date on which the treaty enters into force, shall be permitted in either country, nor shall works be constructed for such purpose, until the section of the commission in whose country the diversion or use is proposed has made a finding that the water necessary for such diversion or use is available from the share of that country, unless the commission has agreed to a greater diversion or use, as set forth in the treaty. For this purpose, the commission is given the power to authorize either country to divert and use water not belonging entirely to such country when the water belonging to the other country can be diverted and used without injury to the latter and can be replaced at some other point on the river.

Consumptive uses from the main stream and from the unmeasured tributaries below Fort Quitman shall be charged against the share of the country making them. Provision is made for temporary diversions and for diversions for power purposes, also for diversion to meet extraordinary drought in one country or the other.

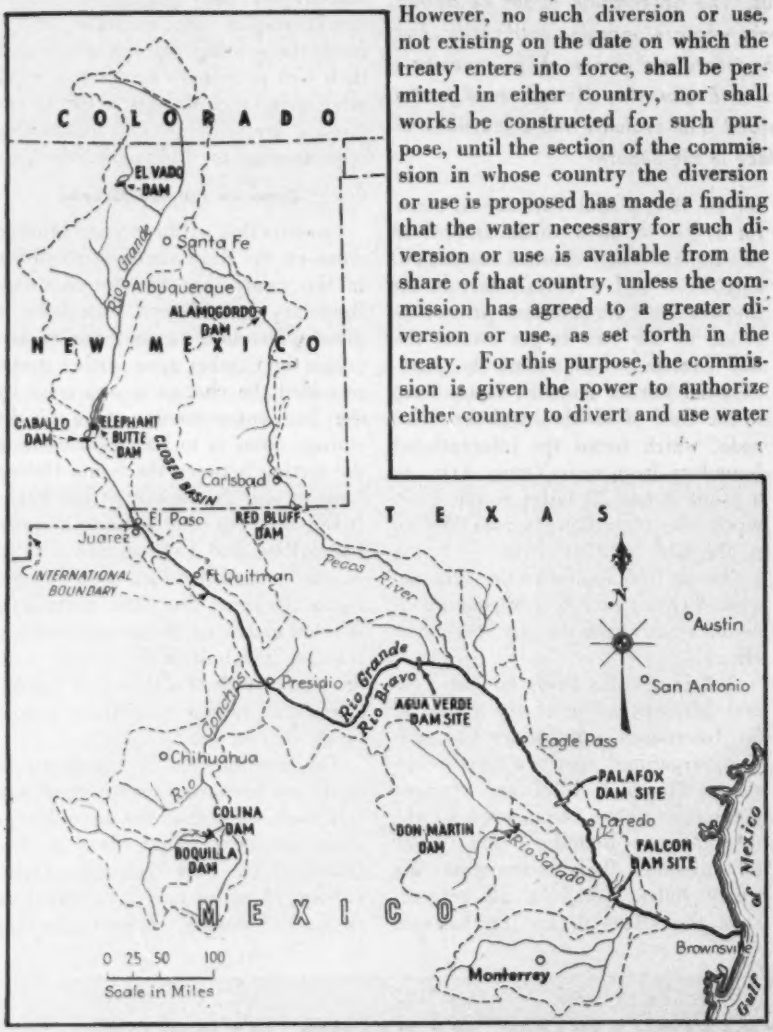

Fig. 1. Below El Paso, the Rio Grande forms the boundary between the United States and Mexico. Construction of three international dams is proposed in that part of the river to store flood waters that now are lost.

Division of the waters

Waters of the Rio Grande between Fort Quitman and the Gulf of Mexico are to be divided between the two countries in the following manner:

To Mexico:

(a) All of the waters reaching the main channel of the Rio Grande from the San Juan and Alamo rivers, including the return flow from the land irrigated from the latter two rivers. [These two streams reach the main river below the lowest feasible international storage site.]

(b) One-half of the flow in the main channel of the Rio Grande below the lowest major international storage dam, so far as that flow is not specifically allotted under the treaty to either of the two countries.

(c) Two-thirds of the flow reaching the main channel of the Rio Grande from the Conchos, San Diego, San Rodrigo, Escondido and Salado rivers and the Las Vacas Arroyo, subject to the provisions of sub-paragraph (c) of the section relating to waters allocated to the United States.

(d) One-half of all flows not otherwise allotted occurring in the main channel of the Rio Grande, including the contributions from all the unmeasured tributaries, which are those not named in this article of the treaty, between Fort Quitman and the lowest major international storage dam.

To the United States:

(a) All the waters reaching the main channel of the Rio Grande from the Pecos and Devils rivers, Goodenough Spring, Alamito, Terlingua, San Felipe and Pinto creeks.

(b) One-half of the flow in the main channel of the Rio Grande below the lowest major international storage dam, so far as that flow is not specifically allotted under the treaty to either of the two countries.

(c) One-third of the flow reaching the main channel of the Rio Grande from the Conchos, San Diego, San Rodrigo, Escondido and Salado rivers and the Las Vacas Arroyo, provided that this third shall not be less than 350,000 acre-ft. annually as an average amount in cycles of five consecutive years. The United States shall not acquire any rights by the use of the water of the tributaries named in this sub-paragraph in excess of the said 350,000 acre-ft. annually, except the right to use

Fig. 2. The All-American Canal was cut through sand hills north of the border in California. The great size of this artificial channel is indicated by the man in the center foreground.

one-third of the flow reaching the Rio Grande from said tributaries, although such one-third may be in excess of that amount.

(d) One-half of all other flows not otherwise allotted by this article occurring in the main channel of the Rio Grande, including the contributions from all the measured tributaries between Fort Quitman and the lowest major international storage dam.

Rivers mentioned in subparagraph (c) of the section relating to waters allocated to Mexico, some of which are not shown in Fig. 1, are all Mexican tributaries. The San Juan is the lowest of the principal tributaries on the Mexican side. El Azucar reservoir, which is referred to subsequently, is located on this river.

In the event of extraordinary drought or serious accident to the hydraulic systems on the measured Mexican tributaries, making it difficult for Mexico to make available the runoff of 350,000 acre-ft. annually, any deficiency existing at the end of the five-year cycle is to be made up in the following five-year cycle with water from the measured tributaries.

When the conservation capacities assigned to the United States in at least two of the major international reservoirs, including the higest major reservoir, are filled with waters belonging to the United States, the cycle of five years shall be considered as terminated and all debits fully paid, whereupon new five year cycle shall commence.

The United States is credited with all inflow from certain of its measured tributaries, and with one-third of the inflow from certain measured Mexican tributaries. Mexico is credited with all the inflow from two of her measured tributaries and with two-thirds of that from certain other of her measured tributaries. All other inflow, from whatever source, is divided equally between the two countries, although the larger part of it originates in Mexico.

About equal division

The flow past Fort Quitman is not treated as solely an American contribution but is divided equally between the two countries. Of recent years this flow has averaged only slightly in excess of 200,000 acre-ft. per year and is composed largely of return flows from irrigation projects above Fort Quitman, both in the United States and Mexico. The effect of the treaty provisions is to divide the water below Fort Quitman about equally between the two countries, although about 70 percent of it originates in Mexico, for the reason that the United States gets a proportion of the flow of certain of her measured tributaties, whereas Mexico gets none of ours, and the unmeasured contributions are equally divided.

It is stated by the drafters of the treaty that this allocation will not interfere with present or planned developments on the United States tributaries, and will suffice to supply present United States uses along the main stream and assure a large expansion of irrigated area on both sides of the river.

Distribution and use of waters belonging to the United States is left in the hands of the state authorities under state law. Furthermore, while the treaty provides for a certain guaranteed delivery from Mexican tributaries, there is no such guarantee as far as tributaries in the United States are concerned. Hence it is a matter entirely within the hands of local and state authorities as to how much water should be used along the tributaries and how much allowed to flow into the main stream to be used on Texas lands bordering the main stream below those tributaries.

Transitory provisions

During a period of eight years from the time the treaty goes into force, or until the beginning of operation of the lowest major international reservoir on the Rio Grande should it be placed in operation prior to the expiration of that time, Mexico agrees to cooperate with the United States to relieve, in time of drought, any lack of water needed to irrigate lands now under irrigation in the lower Rio Grande valley in the United States. For this purpose Mexico will release water from El Azucar reservoir on the San Juan River and allow that water to run through its system

of canals back into the San Juan River in order that the United States may divert such water from the Rio Grande. The manner in which this water is to be released is outlined in the treaty.

Waters of the Colorado

Part 3 of the treaty relates to the allocation and use of waters of the Colorado River. These waters are different from those of the Rio Grande in that all reaching the international border originate in the United States. That fact has complicated our relations with Mexico in the past and is being used now to support the claims of those who oppose ratification of the present treaty.

Both countries draw heavily upon the river for irrigation purposes in regions close to the international border. Since the early part of this century, and until the completion of the All-American Canal in 1942, water was supplied from the Colorado River both to the Imperial Valley in California and to the Mexicali Valley in Mexico through the Rockwood heading and the Alamo Canal. Rockwood heading is located in the United States a short distance above the upper boundary (see Figs. 3 and 4), from whence the canal runs through United States and Mexican territory for about 43 miles, crossing the boundary into California in the vicinity of Calexico. Since the completion of the All-American Canal, the Imperial Valley has been supplied through that facility, but Mexico continues to receive water through the Rockwood heading and the Alamo Canal.

It has long been recognized that a reregulating reservoir on the Colorado below Boulder Dam would be necessary to provide for maximum use of the river's water resources. Construction of such a dam, about midway between Boulder and Parker dams, was authorized in 1941 and work on it was started but was shut down on account of war conditions. Originally called Bullshead Dam, it now is known as Davis Dam after Arthur P. Davis, long head of the Reclamation Service.

Definite provision for use of part of the Davis Dam reservoir for the reregulation called for by the treaty was made by the following provision in the act authorizing its construction:

"When the waters of the Colorado River are apportioned between the United States and Mexico by international agreement, Bullshead dam will serve an important function in providing that fine degree of control needed in effect to meter out the water in accordance with a treaty or agreement. This potential future use has been taken into consideration and is a motivating factor in proposals to build the project, though no costs have been allocated to it."

Under the treaty the United States agrees to build Davis Dam at its own expense within five years after the treaty goes into effect and thereafter to maintain and operate it. A part of the reservoir capacity provided by this dam is to be used to make possible the regulation at the boundary of the water to be delivered to Mexico under the treaty.

The United States also agrees to construct or acquire in its own territory the works that may be necessary to convey a part of the waters of the Colorado River allocated to Mexico to the Mexican diversion points on the international land boundary line. These works include the canal and other works necessary to convey water from the lower end of the Pilot Knob waterway on the All-American Canal to the international boundary. They are to be built (or acquired) and operated and maintained by the United States section, of the commission at the expense of Mexico.

New dam below the border

Mexico is required to construct at its own expense, within five years after the treaty goes into effect, a main diversion structure below the point where the northernmost part of the international land boundary line intersects the Colorado River. If such diversion structure is located in the limitrophe section of the river (*i.e.*, the section forming the international boundary), its location, design and construction shall be subject to approval of the commission, and the commission thereafter shall maintain and operate the structure at the expense of Mexico.

Should Mexico request it, the United States is to build a canal to connect this diversion structure in the limitrophe section with the Mexican canals serving lands in Sonora. Its construction also is to be at the expense of Mexico.

Regardless of where the Mexican diversion structure is located, there shall be constructed and operated at Mexico's expense such levees, interior drainage facilities and other works, or improvements of existing works, as in the opinion of the commission shall be necessary to protect land within the United States against damage from such floods and seepage as might result from the construction of the diversion structure.

Water for Mexico

Of the waters of the Colorado River from any and all sources, there are to be allotted to Mexico:

(a) A guaranteed annual quantity of 1,500,000 acre-ft. to be delivered according to provisions set forth elsewhere in the treaty.

(b) Any other quantities arriving at the Mexican points of diversion, with the understanding that in any year in which there exists a surplus of waters of the Colorado River in excess of the amount necessary to supply users in the United States and the guaranteed quantity of 1,500,000 acre-ft. annually to Mexico, the United States undertakes to deliver to Mexico in the manner set forth elsewhere in this treaty, additional waters of the Colorado River system to provide a total quantity not in excess of 1,700,000 acre-ft. a year. Mexico shall acquire no rights beyond that provided by this sub-paragraph to the use of the waters of the Colorado River system for any purpose whatsoever in excess of 1,500,000 acre-ft. annually.

In the event of extraordinary drought or serious accident to the irrigation system in the United States, thereby making it difficult for the United States to deliver the guaranteed quantity of 1,500,000 acre-ft. a year, water allocated to Mexico under sub-paragraph (a) above will be reduced in the same proportion as consumptive uses in the United States are reduced. (Consumptive use is defined in the treaty as "the use of water by evaporation, plant transpiration, or other manner whereby the water is consumed and does not return to the source of supply. In general, it is measured by the amount of water diverted less the part thereof which returns to the stream.")

The United States is to deliver 1,000,000 acre-ft., annually to Mexico in the limitrophe section of the river, from the time the Davis Dam is placed in operation until Jan. 1, 1980, and thereafter 1,125,000 acre-ft. annually.

During the period from the time that Davis Dam goes into operation until Jan. 1, 1980, the United States shall also deliver to Mexico annually 500,000 acre-ft., and thereafter 375,-

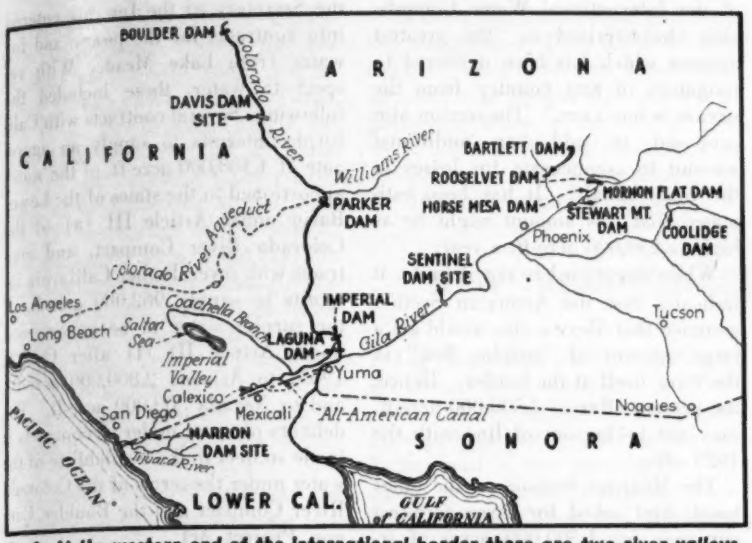

Fig. 3. At the western end of the international border there are two river valleys in which both countries have an interest, the Colorado with its great potentialities for irrigation and the very much smaller Tijuana. For details of the international section of the Colorado River near Yuma see Fig. 4.

000 acre-ft., at the international boundary line by means of the All-American Canal and a canal connecting the lower end of the Pilot Knob wasteway with the Alamo Canal or with any other Mexican canal which may be substituted for the Alamo.

In consideration of the use of the All-American Canal for this purpose, Mexico agrees to pay a proportion of the costs actually incurred in the construction of Imperial Dam and the Imperial Dam-Pilot Knob section of the All-American Canal, also a proportionate part of the cost of maintaining and operating these facilities.

In the event of an excess in any year beyond the water necessary to satisfy the requirements of the United States and the guaranteed quantity of 1,500,000 acre-ft. allotted to Mexico, the United States declares its intention to cooperate with Mexico in attempting to supply additional quantities of water through the All-American Canal and, similarly, in years of deficiency, Mexico will attempt to curtail deliveries requested to be made through the canal.

Not enough water

Because of the vast areas of land in and near the Colorado River basin that only need water to make them fertile, the waters of that great stream have been the subject of controversy for many years. Early irrigation developments on a large scale in the Imperial Valley in California and across the border in the state of Lower California aroused fears in the other states of the Colorado basin that rights to most of the available water would be established in California before those states could establish rights to water needed for irrigation projects within their own borders. This, among other causes, resulted in the Colorado River Compact, drawn up in 1922 by representatives of the seven states and subsequently ratified by all.

The Colorado River compact

The compact divided the basin at Lee Ferry, and definitely apportioned a large part of the water between the states of the Upper Basin (Colorado, New Mexico, Utah and Wyoming) and those of the Lower Basin (Arizona, California, Nevada, New Mexico and Utah). Further, it recognized that at some future date Mexico would probably have a share in the apportionment.

Article III of that compact is the most significant one with respect to the present treaty. Section (a) apportioned to each basin "the exclusive beneficial use of 7,500,000 acre-ft. of water per annum," and Section (b) gave the Lower Basin the right to increase its beneficial consumptive use by 1,000,000 acre-ft. per annum. Section (c) provided that "If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River System, such waters shall be supplied first from the waters that are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then the budren of such deficiency shall be equally borne by the Upper Basin and the Lower Basin, . . ."

Provision for "further equitable apportionment" of the waters of the Colorado River System unapportioned by sections (a), (b) and (c) was made in Section (f), but such apportionment was not to be made until Oct. 1, 1963, and not then unless either basin shall have reached its total beneficial consumptive use of the waters apportioned to it under sections (a) and (b). In other words, neither basin could establish any valid claim to waters in excess of those apportioned under sections (a) and (b) until after 1963 at the earliest. This appears significant in connection with the claims now made by California as presented later in this article.

Mexico's position

Mexico always has been an important factor in the development of the delta regions of the lower Colorado basin. Much of the early irrigation work in the Imperial Valley of southern California could not have taken place without her cooperation in getting water from the river to those lands at a reasonable cost, and it was necessary for this country to get permission from Mexico to build levees in Lower California to protect Imperial Valley lands from the devastating floods that swept over the delta area before Boulder Dam was built. By far the greater part of the cost of this work was borne by the Imperial Irrigation District, the Southern Pacific Co. and the U. S. Government, though Mexican lands benefited from the levees.

Years ago, when the river was still navigated by small boats, Mexico agreed never to put obstructions in the river that would prevent our use of it for navigation. Due to the form of the delta region, the practical effect of this was to compel Mexico, in order to get any large quantity of water for irrigation, to take the water from canals originating on our side of the border. We have never released Mexico from this obligation to

maintain the now highly theoretical navigability of the river, presumably because it gave us a bargaining advantage. We, on the other hand, have dammed the river in complete disregard of its supposed navigability.

Imperial Valley developments

Early in this century Californians owning land in the Imperial Valley and Mexican interests owning land south of the border entered into an agreement with other Mexican interests whereby permission was obtained from the Mexican government to build the canal through Mexico now known as the Alamo Canal. It was constructed to have a nominal capacity of 10,000 cu. ft. of water per second.

In order to conform with Mexican law, the terms of this contract were written in the form of a concession from the Mexican government to the Mexican interests in Lower California, which interests later became a subsidiary of the Imperial Irrigation District in California. The concession was approved by the Mexican Congress in 1904. It gave to Mexican interests the right to take not to exceed half the flow in the canal to irrigate lands in Lower California.

Until the All-American Canal was put in operation in 1942, the Alamo Canal was used to carry all the water required to irrigate 228,000 acres of land in Mexico and 440,000 acres in the Imperial Valley in California. About one third of the canal flow was wasted into Salton Sea to keep the canal in condition.

Prior to the placing of Boulder Dam in operation in 1935, the average annual diversion through the Alamo Canal over a period of 13 years was 2,970,000 acre-ft. Under the concession that the predecessors of the Imperial Irrigation District had received from the Mexican government, irrigation interests in Mexico were entitled to half that flow, or approximately the amount of water that now is proposed to be allocated to Mexico under the new treaty. Mexico also took water from the river by pumping.

In 1927-29 an attempt was made to reach an understanding with Mexico by treaty with respect to the international rivers. At that time the United States offered to deliver to Mexico, presumably at the laterals of the Alamo Canal, 750,000 acre-ft. annually, which the American Section of the International Water Commission characterized as "the greatest amount which has been delivered to irrigators in that country from the stream in any year." The section also proposed to add "an additional amount to compensate for losses in the main canal." It has been estimated that this amount might be as high as 250,000 acre-ft. a year.

While the record is not definite, it indicates that the American Section assumed that Mexico also would get a large amount of "surplus flow" in the river itself at the border. Hence, the present offer of 1,500,000 acre-ft. may not be far out of line with the 1929 offer.

The Mexican Section, on the other hand, first asked for three acre-feet per year for 1,500,000 acres of irrigable land in Lower California, or 4,500,000 acre-ft. Subsequently it reduced the amount to 3,480,000 acre-ft. This was based on an estimate that there were 6,000,000 acres of land in this country and 1,500,000 acres in Mexico that could be irrigated from the river by gravity or by pump lifts not exceeding 80 ft. Taking the flow of the river at Yuma as 17,400,000 acre-ft. annually, a division of the flow among these lands would give 13,920,000 acre-ft. to the U. S. and 3,480,000 acre-ft. to Mexico.

The U. S. Section objected to such a division, and in the end no agreement was reached.

Since that time Mexican use of water has increased, amounting to 1,833,000 acre-ft. in 1943, according to proponents of the treaty, and to not over 1,300,000 acre-ft., according to treaty opponents.

Boulder Dam started

Meanwhile, plans for construction of Boulder Dam were taking form under the Boulder Canyon Project Act passed on Dec. 21, 1928. On June 25, 1929, President Hoover declared the Colorado River Compact in effect and the Boulder Canyon Project Act effective, and on March 11, 1931, a contract for construction of Boulder Dam was signed.

Boulder Dam was designed to prevent floods that had endangered the irrigated lands in both Mexico and the United States in past years, to regulate the flow of the lower river by storing 30,500,000 acre-ft. of water, and to generate power. Its costs water, and to generate power.

the Secretary of the Interior entered into contracts for the power and for water from Lake Mead. With respect to water, these included the following: Several contracts with California interests to supply an aggregate of 4,400,000 acre-ft. of the water apportioned to the states of the Lower Basin under Article III (a) of the Colorado River Compact, and contracts with several other California interests to supply 962,000 acre-ft. of the surplus water to be apportioned under Article III (f) after Oct. 1, 1963; to Arizona 2,800,000 acre-ft., and to Nevada 300,000 acre-ft. The delivery of water under all contracts is made subject to the availability of the water under the terms of the Colorado River Compact and the Boulder Canyon Project Act.

All-American Canal

The Boulder Canyon Project Act also authorized construction of a canal entirely within the United States to serve the Imperial and Coachella irrigation districts, and if necessary a dam to divert water from the river into the canal. Construction of that project was begun in 1934, it having been decided to build a dam, now known as Imperial Dam, across the river about five miles above Laguna Dam near Yuma, Ariz.

Laguna Dam had been built previously to supply water for the Yuma irrigation project. It is a low weir across the river which only raises the water surface above 10 ft. above the low stage. Diversion is made on the California side, the water being carried down through a canal about 8 miles long to Siphon Drop where there is a power plant five miles upstream from the siphon that carries the water under the river.

The All-American Canal was built with a capacity of 15,155 cfs. from Imperial Dam to Siphon Drop, where 2,000 cfs. can be diverted to the Yuma Canal; and with a capacity of 13,155 cfs. to Pilot Knob, where delivery of 3,000 cfs. (2,272,000 acre-ft. per year) can be made to the Alamo Canal and Mexico or can be returned to the river through a projected power plant. Beyond Pilot Knob the capacity is 10,155 cfs. The extra 155 cfs. is for the city of San Diego, which has a contract with the Secretary of the Interior for 112,000 acre-ft. per year.

Under the original contract between

the Secretary of the Interior and the Imperial Irrigation District for construction of Imperial Dam, the desilting works and All-American Canal, title to all the facilities except the dam, desilting works and the canal down to and including Siphon Drop could, at the discretion of the Secretary, be transferred to the district upon repayment by it of the expenditures made by the federal government. All power possibilities below Siphon Drop, including these resulting from water carried to Pilot Knob for delivery to Mexico, accrue to the district or other agencies sharing in repayment of the cost of the undertaking.

The treaty makes it necessary for the federal government to retain title to all the works down to and including the structures at Pilot Knob for delivery of water to Mexico. It provides, as noted, that Mexico shall pay a proportionate share of the cost of this work, thus reducing the amounts to be repaid to the federal government by the Imperial Irrigation District.

The treaty provides further that if a power plant is built on Pilot Knob and if the proceeds from power sales are used to amortize the cost of the canal and appurtenant works, then a proportionate part of the proceeds are to be used to pay Mexico's share of the cost of these works.

NEW TREATY ENDORSED AND OPPOSED

The treaty was sent to the Senate for consent to its ratification last February, but hearings before the Senate Foreign Relations Committee did not begin until a few days ago. The states of Arizona, Colorado, New Mexico, Texas, Utah and Wyoming are expected to favor ratification. On Aug. 29 last, representatives of those states, sitting as the Six States Committee, adopted a resolution favoring such ratification, declaring that the allocation of 1,500,000 acre-ft. annually to Mexico is fair and equitable

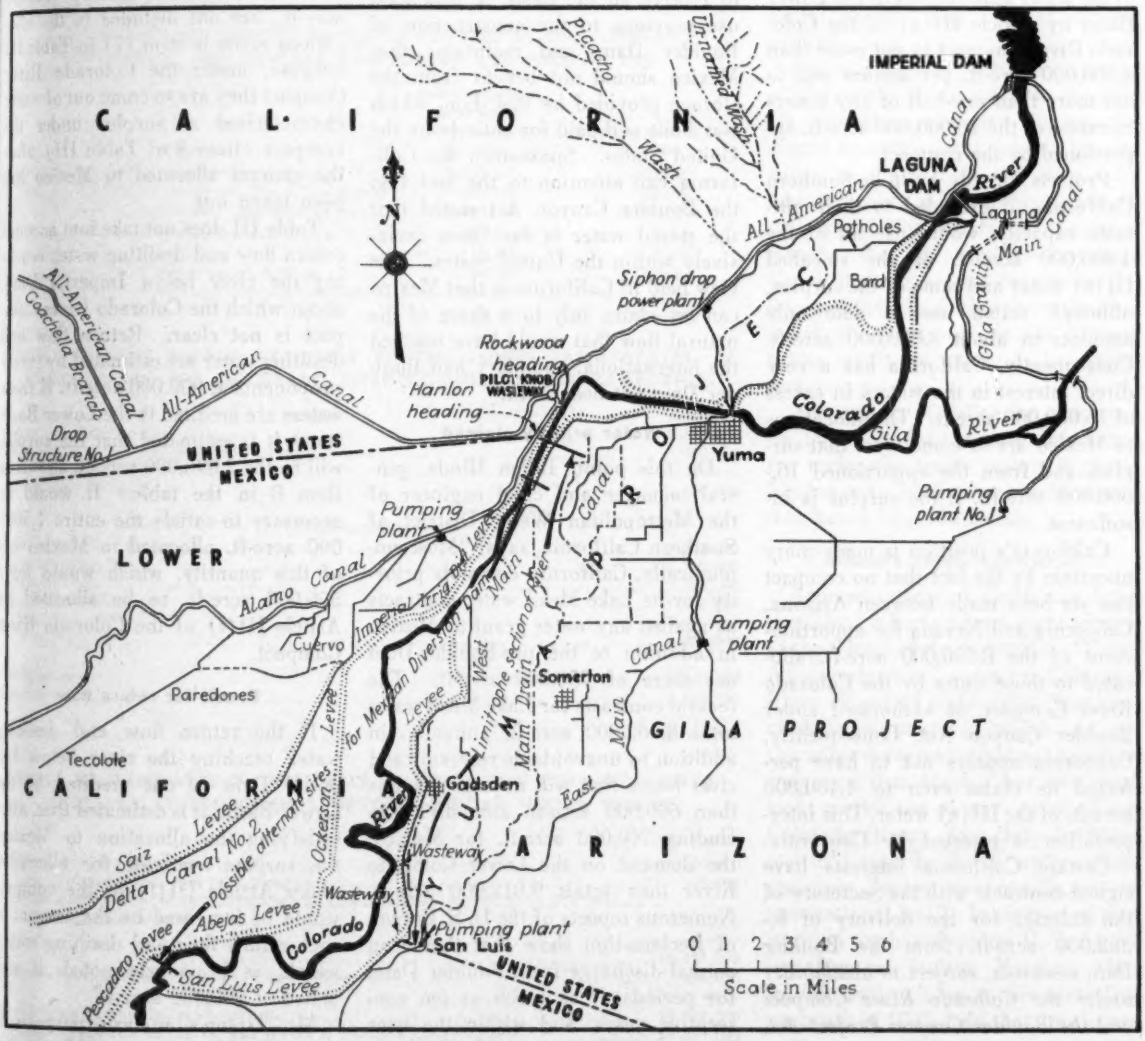

Fig. 4. Colorado River valley near Yuma showing the location of the dams used to divert water from the river for irrigation. All diversions now are made north of the international section of the river, but the new treaty authorizes dams further downstream.

to both countries. California, on the other hand, is opposed to the treaty, and interested organizations in that state like the Metropolitan Water District of Southern California are actively objecting to ratification.

California objects

California's objection finds its origin in the fact that there are much larger areas susceptible to development through irrigation in that state than can be irrigated with water that could be made available to the state from the Colorado under the most favorable circumstances. Potential water use in California is so great that before other states of the basin would approve the Boulder Canyon Act they stipulated that California, by statute, should limit its use of the water apportioned to the Lower Basin by Article III(a) of the Colorado River Compact to not more than 4,400,000 acre-ft. per annum and to not more than one-half of any waters in excess of the 16,000,000 acre-ft. apportioned by the compact.

Projects already built in Southern California, if extended to their ultimate capacity, would use all of the 4,400,000 acre-ft. of the so-called III(a) water and some of the surplus, although actual use to date only amounts to about 3,000,000 acre-ft. Consequently, California has a very direct interest in the waters in excess of 16,000,000 acre-ft. The allocations to Mexico are to come from that surplus, and from the apportioned 16,000,000 acre-ft., if the surplus is insufficient.

California's position is made more uncertain by the fact that no compact has yet been made between Arizona, California and Nevada for apportionment of the 8,500,000 acre-ft. allocated to those states by the Colorado River Compact, as authorized under Boulder Canyon Act, Consequently, California appears not to have perfected its claim even to 4,400,000 acre-ft. of the III(a) water. This interpretation is rejected by California.

Certain California interests have signed contracts with the Secretary of the Interior for the delivery of 5,362,000 acre-ft. from the Boulder Dam reservoir, *subject to availability under the Colorado River Compact and the Boulder Canyon Project Act.* The amounts covered by these contracts are given in Table I.

Other contracts for Lake Mead water are: Arizona, 2,800,000 acre-ft.; and Nevada, 300,000 acre-ft. per annum.

An unanswered question with respect to these contracts for water from Lake Mead is what provision is to be made for evaporation and other losses. The answer to that question has an important bearing on the amount of water that will be available as "surplus" under the Colorado River Compact.

Spokesmen for California claim that there is not enough water to meet the commitments already made for water from Lake Mead. The situation as they see it is shown in Table II.

California maintains that the 1,500,000 acre-ft. allocated to Mexico is about twice what Mexico is entitled to receive on the basis of beneficial use previous to the construction of Boulder Dam, and maintains that Mexico should not benefit from the storage provided by that dam, which was built and paid for entirely by the United States. Spokesmen for California call attention to the fact that the Boulder Canyon Act stated that the stored water is for "uses exclusively within the United States." The view held in California is that Mexico can lay claim only to a share of the natural flow that would have reached the international boundary had Boulder Dam not been built.

Water priority claimed

On this point, Julian Hinds, general manager and chief engineer of the Metropolitan Water District of Southern California, says: "Most emphatically, California demands priority for its Lake Mead water contracts as against any water grant to Mexico in addition to the pre-Boulder-Dam use there of 750,000 acre-ft. The federal contracts for Lake Mead water total 8,462,000 acre-ft. annually, in addition to unavoidable reservoir and river losses that will average not less than 600,000 acre-ft. annually. Including 750,000 acre-ft. for Mexico, the demand on the Lower Colorado River then totals 9,812,000 acre-ft. Numerous reports of the U. S Bureau of Reclamation show that the mean annual discharge from Boulder Dam, for periods of as much as ten consecutive years, and within the near future, with Upper Basin development only about 80 percent of its compact allowance, will not exceed 8,500,000 acre-ft. The inevitable shortage, giving Mexico only its pre-Boulder use, or one-half the treaty grant, is thus 1,312,000 acre-ft. or 15 percent of the available supply. A drought period larger or more severe than the one recorded from 1930 to 1940, or additional Upper Basin development as planned for that region, would make this water shortage greater."

Proponents water estimates

No such pessimistic view of the water situation is taken by the proponents of the treaty. An estimate prepared by Royce J. Tipton, consulting engineer of Denver, for the Colorado Water Conservation Board, is given in Table III.

In connection with this table it should be noted that items (4), (5) and (6) in Table I, totaling 962,000 acre-ft., are not included in the allocations given in item (7) in Table III because, under the Colorado River Compact they are to come out of water characterized as surplus under the compact (Item 8 of Table III) after the amount allocated to Mexico has been taken out.

Table III does not take into account return flow and desilting water reaching the river below Imperial Dam, about which the Colorado River Compact is not clear. Return flow and desilting water are estimated by treaty proponents at 900,000 acre-ft. If these waters are credited to the Lower Basin states it is estimated that the surplus will be the 2,096,000 acre-ft. shown as Item 8 in the table. It would be necessary to satisfy the entire 1,500,000 acre-ft. allocated to Mexico out of this quantity, which would leave 596,000 acre-ft. to be allocated by Article III(f) of the Colorado River Compact.

Credit for return flow

If the return flow and desilting water reaching the river below Imperial Dam is not credited to the Lower Basin, it is estimated that, after satisfying the allocation to Mexico, the surplus available for allocation under Article III(f) of the compact would be increased by the amount of such return flow and desilting water, which, as previously noted, is estimated at 900,000 acre-ft.

Mr. Tipton's analysis purports to show that during such a low water period as 1930 to 1941, inclusive, all the water allocated to the Lower Basin

from the main stream under Article III(a) and III(b) of the compact, the water allocated to Mexico by the treaty, and all III(f) water indicated above can be made available by permissible drawdown of the reservoirs now constructed and to be constructed on the main stream in the Lower Basin.

Mr. Hinds is very skeptical about these estimates of return flow below Imperial Dam and Gila River inflow to the Colorado. "Probably nowhere in the world," he states, "is return flow and drainage water reuse more widespread and intensive than in central Arizona and along the Gila River. With over 700,000 acres irrigated in this region, more or less adequately, the flow of the Gila River at the gaging station near its mouth has been zero during the three years Aug. 19, 1941, to Sept. 30, 1944.

"If the present irrigated area is increased by 50 percent by the diversion of from 1,500,000 to 2,800,000 acre-ft. from the Colorado River to central Arizona it will be by means of pump lifts of 300 ft. or more for the Gila project, or at least 1,040 ft. for the Parker-Phoenix aqueduct, so that pumping and repumping of return flow will become relatively far more profitable. If the last residue is too saline for any type of use in Arizona it will be too saline for irrigation use in Mexico. Then if dilution with mainstream Colorado River water should restore its usability, such flow could be reclaimed from the Colorado River below Imperial Dam for use in the United States by a moderate pump lift of not over 50 ft. or far less than planned for the new Arizona projects. Considered on any conceivable basis, the treaty return flow argument is not a mystery but merely a myth or undiluted hokum."

By the treaty terms, according to Mr. Hinds, "only those flows will be credited that are less than the stipulated schedule of Mexico's irrigation needs, which may be at Mexico's option as low as 600 cfs. during the five winter months, November to March. Then even though the return flow should prove to be as large in annual acre-feet as claimed, if summer reuse leaves only winter return flow to cross the international boundary, the treaty credit for the same would be less than 200,000 acre-ft. annually."

On this latter point, proponents of the treaty point out that the 600 cfs. minimum delivery during the winter months relates only to the delivery in the bed of the river. In addition there is a minimum rate of delivery of 300 cfs. during the same months through the All-American Canal, making a total maximum delivery of 900 cfs. during those months, which should insure to the United States credit for most of the return flow.

The option of delivering water at the land boundary given to this country under the treaty makes it possible for us to avail ourselves of return flow below Imperial Dam.

Mexico's rights questioned

Representatives of California hold that Mexico has no legal right to any of the waters of the Colorado. "Careful investigation," states the Colorado River Board of California, "has disclosed no instance in which any responsible American diplomat has ever suggested that Mexico has any legal right to the use of any water of the Colorado River. Any claim by Mexico to Colorado River water must, therefore, depend upon comity, not on international law." In support of this position the board quotes U. S. Attorney General Judson Harmon who, in a formal opinion to the State Department in 1895, held that "the lower nation on an international river has no legal right to the continuance of any flow of the river from the upper

TABLE I—APPORTIONMENT OF WATER COVERED BY CALIFORNIA'S CONTRACTS FOR BOULDER DAM WATER AND PRESENT USE

Projects	Apportionment of water under water contracts acre-feet	Estimated present use acre-feet
(1) Palo Verde and Imperial Irrigation districts	3,850,000	2,650,000
(2) Metropolitan Water District and City of Los Angeles	550,000	85,000
(3) Total of III (a) water under Colorado Compact	4,400,000	2,735,000
(4) Metropolitan Water District and Los Angeles	550,000	None
(5) City and County of San Diego	112,000	None
(6) Imperial and Palo Verde irrigation districts	300,000	None
(7) Total of III (f) water under Colorado Compact	962,000	None
(8) Grand Total	5,362,000	2,735,000

TABLE II—WATER SUPPLY AVAILABLE TO THE LOWER BASIN STATES, AS ESTIMATED BY THE COLORADO RIVER COMMISSION OF CALIFORNIA

Supply	Acre-feet
Outflow from Boulder Dam	8,500,000
Reservoir and other river losses below Boulder Dam	600,000
Available for use	7,900,000
Requirements	
Nevada contract	300,000
California contracts	5,362,000
Arizona contract	2,800,000
Proposed Mexican treaty	1,500,000
Total	9,962,000
Available supply	7,900,000
Requirements	9,962,000
Deficit	2,062,000

TABLE III—ESTIMATES OF AVAILABLE WATER IN THE COLORADO RIVER PREPARED BY PROPONENTS OF THE MEXICAN WATER TREATY

	Acre-feet
(1) Virgin flow into Lake Mead	17,400,000
(2) Virgin inflow Boulder Dam to Imperial Dam	195,000
(3) Virgin inflow to the Colorado River from the Gila River basin, per report by U. S. Bureau of Reclamation in 1934	1,331,000
(4) Total	18,926,000
(5) Losses between Boulder Dam and Imperial Dam	830,000
(6) Net virgin flow at Mexican boundary	18,096,000
(7) Allocations by Sections III (a) and III (b) of Colorado River Compact	16,000,000
(8) Surplus to be allocated, in accordance with Article III (c) and III (f) of the Colorado River Compact	2,096,000

nation. Any other rule would give the lower nation a servitude or easement within the territory of the upper inconsistent with the exclusive sovereignty of the latter within its borders."

California's representatives make the further claim that if our Senate rejects this treaty, Mexico cannot get the issue settled by an international court of arbitration because our Senate, when it approved the Inter-American Arbitration Treaty, made a reservation that would effectively prevent this question being made the subject of arbitration.

In response to these claims by California, proponents of the treaty point out that an opinion of the Attorney General of the United States does not make international law, especially when the Attorney General is building up a case for his client, as was the situation when Mr. Harmon said that Mexico has no legal right to the continuation of any flow from the upper nation. They state that the U. S. Supreme Court specifically repudiated the Harmon finding when Colorado urged that it be applied to the Laramie and Arkansas rivers.

The proponents further point out that the Judson Harmon opinion was rendered in connection with the controversy over the use of the waters of the Upper Rio Grande but that in spite of the opinion the United States did not follow it in resolving the controversy. They state that international comity is controlling in the end if the United States is to avoid serious conflicts and controversies.

Prior appropriation recognized

Proponents note further that California's own Colorado River Commission in 1930 said: "It is a well recognized principle of water law among the Western states that the first user of water is the one who has the greater right and can protect this right against late users." They observe also that California depends upon the application of this principle for continuing use of water from the Colorado, for like Mexico, it originates none of the water that it takes from the river. They see no equity in a proposal to deny in international law the application of a principle that is accepted and applied to interstate waters.

With respect to the Senate's reservation, J. S. Breitenstein, attorney for the Colorado Water Conservation Board, in discussing the Inter-American Arbitration Treaty, states: "A full reading of the *Congressional Record* reveals that the senators realized that there would be, in any event, an obligation to arbitrate, and that the United States could not avoid or evade such obligation by refusal to make the requisite special agreement," to which the Senate reservation applied.

Danger seen in delay

Proponents hold that only by definitely establishing the amount of flow to which Mexico is entitled will it be possible to make the maximum use of the waters of the Colorado Rover in this country without risk of having an international arbitration commission award Mexico at some future date a much larger quantity of water than is now assumed as due to that country.

Every day's delay in settling this issue, the proponents state, improves Mexico's claim to a larger share of Colorado water under the prior-use principle that we have consistently applied to interstate waters. In the period 1939-43 the average annual releases from Boulder Dam amounted to 12,000,000 acre-ft., of which 8,300,000 acre-ft. passed the Yuma gaging station, which is below all U. S. diversion points. Lacking an agreement with Mexico setting an upper limit on the amount of water which that country can claim, Mexico is free to draw on this now well regulated flow to expand its irrigation developments. Thus, proponents state, Mexico's position before an international arbitration court, or in the event of future treaty negotiations, will be improved under the doctrine of prior appropriation by every year that we delay settlement of this water question.

Spokesmen for California argue that appropriative water law recognizes that conservation must precede use; that water from a project like Boulder Dam cannot be put to use overnight. Under this law, an appropriator can take a reasonable time to utilize the flow of water allocated to him provided he shows "due diligence" in development. Application of this principle, they hold, would not permit Mexico to perfect a right to waters stored behind Boulder Dam just because full use of those waters has not yet been made north of the border.

Californians object to the treaty as a violation of the Colorado River Compact and the Boulder Canyon Project Act. They claim also that it endangers investments already made in that state in good faith under the provisions of those two acts.

In answer to these claims, proponents point to the fact that all contracts for delivery of Lake Mead water are subject to the "availability of the water under the Colorado River Compact and the Boulder Canyon Project Act;" also that both acts anticipate the time when this country and Mexico will reach an agreement as to an equitable division of Colorado River waters, and that the compact specifies the waters from which Mexico's share is to be taken.

Proponents point out that even the contracts with California interests which provided for the delivery of 4,400,000 acre-ft. of III(a) water from Lake Mead are firm only to the extent that water is available to them under the terms of the Colorado River Compact and the Boulder Canyon Project Act. Further, the proponents state that the contracts for delivery of water to the so-called junior priorities (Item (4) (5) (6) in Table I) amounting to 962,000 acre-ft. are entirely infirm because no allocation of water for that purpose has been made under the Colorado River Compact and cannot in any event be made prior to Oct. 1, 1963. As a consequence, they state that if California agencies have constructed works whose feasibility depends on the availability of water under the junior priorities, those works were of questionable feasibility when constructed and if anything their feasibility will be improved rather than injured by a treaty which fixes the amount of water that Mexico can claim.

Question of exclusive use

In charging that the treaty violates the Boulder Canyon Act, spokesmen for California lay much emphasis on the fact that the preamble of that act states that the waters stored behind Boulder Dam are to be used "exclusively within the United States." The significance of those words—if they have any real significance—is not clear because the whole act is predicated on the Colorado River Compact," which compact recognized the possibility that a future treaty might require the delivery of specified

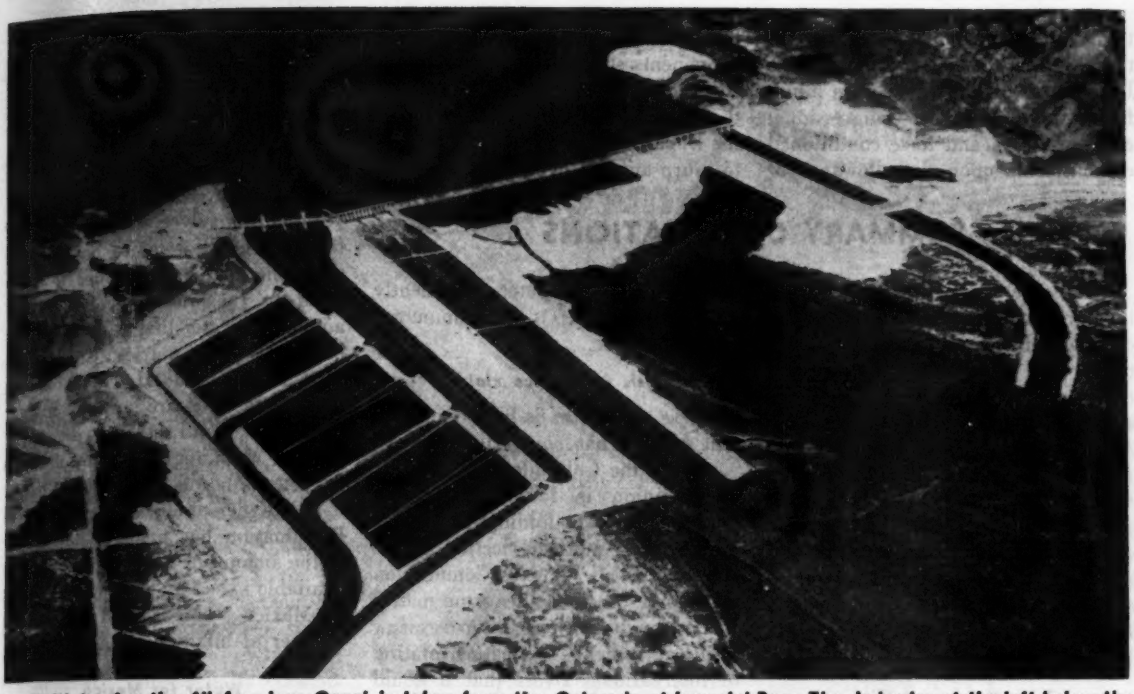

Fig. 5. Water for the All-American Canal is taken from the Colorado at Imperial Dam. The six basins at the left below the dam are for taking silt out of the water before it passes into the canal.

amounts of water to Mexico. But whatever may have been the objective of congressmen who put those words into the bill, their possible effect on a treaty with Mexico appears to be nullified by Section 20 of the act, which reads "Nothing in this act shall be construed a denial or recognition of any right, if any, in Mexico to the use of the waters of the Colorado River system."

It might be that the requirement that the water be used exclusively within the United States was inserted in the act to keep water allocated to interests on this side of the border from being sold to Mexican users after a definite amount had been allocated to Mexico at prescribed points of delivery.

A water trade claimed

Californians assert that the treaty represents a trade of 1,500,000 acre-ft. of Colorado River waters in return for 350,000 acre-ft. of water from Mexican tributaries of the Rio Grande for use in Texas. On this subject Mr. Hinds says in part: "That a trade did occur is obvious and apparent to the affected California interests and is established by the insistence of the Mexican representatives on a treaty to settle the water problems of both rivers."

Those who participated in negotiations leading up to the treaty deny that Colorado River waters were traded for concessions along the Rio Grande. They state that each river was considered separately. They add that it was quite natural for Mexico to insist that questions with respect to the Rio Grande, where the physical conditions favor Mexico, be not settled without settlement of questions respecting the Colorado. That, they hold, did not preclude independent findings with respect to each river.

Finally, spokesmen for California hold that the powers granted by the treaty to the International Boundary and Water Commission are vast and not subject to control by Congress. "All customary checks and limitations on such an agency are lacking," states the Colorado River Board of California, "save only that the commission must report its decisions for approval or veto by the government, which for this purpose is specifically defined as being the Department of State (Article II). No plans and cost estimates need ever be submitted to Congress, nor is Congress to be consulted at all. When the commission has made a decision and the Department of State has approved, Congress must appropriate or breach the treaty."

Here again, advocates of the treaty find no such implication in its wording. They note that the jurisdiction of the commission is specifically limited by Article II of the treaty as follows: "The jurisdiction of the commission shall extend to the limitrophe parts of the Rio Grande and the Colorado Rivers, to the land boundaries between the two countries, and to works located upon their common boundary, each section of the commission retaining jurisdiction over that part of the works located within the limits of its own country."

Congress has final say

Treaty proponents deny the charge that the treaty, by providing in Article 2 that all joint action and joint agreement shall be handled "by or through" the Department of State of the United States and the Ministry of Foreign Relations of Mexico, has the effect of doing away with all Congressional control. Congress may by law provide for the appointment, tenure, and compensation of not only the United States Commissioner but also all officials and employees of the United States Section. And, what is more important, they state, Congress has absolute control over the appropriations which must be made to furnish funds for the construction, opera-

tion, and maintenance of works. In the past both the Commission and the Department of State have been mindful of the necessity of Congressional appropriations and have conditioned commitments upon the allowance of the necessary appropriations. The proponents state that there is no justification for any assumption that in the future either the commission or the Department of State will endeavor to usurp any prerogative of Congress.

SUMMARY OBSERVATIONS

These are the principal questions that are expected to be actively discussed in the Senate before the treaty comes to vote. No one of the objections to the treaty appear to be so fundamental as to call for complete rejection by the Senate. Minor defects in the treaty can be corrected by attaching protocols to it. One such protocol has been approved by representatives of both countries to clarify the treaty's provision with respect to the jurisdiction of the American and Mexican sections of the International Boundary and Water Commission.

Two major questions

Only two questions that have been raised concerning the treaty are of major importance. They are these: What rights has Mexico to waters of the Colorado River originating north of the international border; and, if Mexico has rights, is the apportionment of those waters made to Mexico adequate to satisfy those rights and at the same time equitable to the states whose potential resources are reduced by the apportionment. This latter question is of special concern to people of Arizona and Southern California because, by expanding their irrigation developments, they could use practically all the waters of the Colorado that now reach the border. In California, both the All-American Canal and the aqueduct of the Metropolitan Water District of Southern California are designed for greater capacity than they now are carrying. Farther east, Arizona is actively planning irrigation developments that could be expanded beyond the amount of water for which that state has contracts with the Department of the Interior.

Californians point to the fact that construction of Boulder Dam was only made possible by their agreement to enter into advance contracts for enough power from the dam to insure repayment to the federal government its investment in the dam. Under these circumstances their efforts to hold the amount of water permanently allocated to Mexico to a minimum are understandable.

Basis for Mexico claims

There appears to be little doubt but that Mexico has *some* rights to the waters of the Colorado. Support for this opinion is found in various places, notably in findings of the report of the American Section of the International Water Commission made in 1930 when this same matter was under discussion. After a review of all agreements or treaties relating to international rivers that it could locate, the committee said: "In all the eleven international agreements cited above, involving many nations and rivers, existing uses of water were recognized and protected as prior appropriation".

In this country, we apply the same rule to our interstate waters.

In this connection it should be noted by building Boulder Dam we radically altered the regimen of an international river. While it is true that by building the dam we protected lands in Mexico as well as in our own country from destructive floods and made a much more uniform flow potentially available for irrigation of lands on both sides of the border, it also is true that we created a condition that makes it possible for us, at some time in the future, to cut off *all water* to Mexico for many months, other than flash floods from the Williams and Gila rivers and return flow reaching the river below Imperial Dam.

Approached from that angle, it becomes apparent that an assertion written into the Boulder Canyon Act that the waters stored behind Boulder Dam are for use "exclusively within the United States" cannot deprive Mexico of the right to share in the use of those waters. In fact, Mexicans have held with some justification that in building Boulder Dam without first entering into an agreement with Mexico concerning the waters of the river we violated a treaty then in force.

Obviously, the legal questions raised by these and other considerations are involved and will call for a high order of statesmanship if they are to be answered equitably.

Equally involved is the question of the amount of water to be allocated to Mexico, in part because it is related to the question of the total amount of water that is available for use in the two countries. Comparison of Tables II and III will show that water authorities are far apart in their conclusions as to the total, due to the number of intangibles that enter into its determination.

It is understood that the Bureau of Reclamation has made a new study of the amount of water that should be available to satisfy the apportionment to Mexico. This should reduce the number of intangibles.

Water for Mexico

As noted in the summary of arguments for and against the treaty, Representatives of California hold that Mexico should be limited to the waters it put to beneficial use before the construction of Boulder Dam, but others hold that Mexico is entitled to an opportunity to expand its uses of the river's waters, just as the states on this side of the border plan to expand theirs.

After long deliberation, engineers representing the two countries in the treaty negotiations arrived at the figure of 1,500,000 acre-ft. Whether the Senate reaches a like conclusion after hearing all the arguments for and against it remains to be seen. However, it is to be hoped that the whole treaty will not be rejected simply on that score, thus putting to nought all the good work represented by other sections of the treaty, especially those relating to the Rio Grande, where a mutually satisfactory solution of difficult questions appears to have been found. The treaty is before the Senate for "advice and consent to ratification". The Senate, if it finds this figure too high (or too low) could so advise the President, leaving the way open to a reconsideration of that figure without discarding all the work on the remainder of the treaty.

Indefinite postponement of settlement of this international issue will help no one.

Moment Distribution by Symmetry And Anti-Symmetry

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Contents in Brief—Advantage may be taken of the symmetry of a structure to reduce calculations to a minimum. Using the concept of symmetrical and anti-symmetrical loading, the analysis of monolithic structures is considerably shortened. Several bents and closed frames are analyzed to illustrate the method, as applied to simple numerical analysis by moment distribution.

PROBABLY about ninety percent of the indeterminate structures occurring in an engineer's practice are symmetrical. This includes continuous beams, rigid frames, viaduct bents, portals, hangars, roof frames, bridge piers and suspension bridge towers. For such structures, the conventional methods of analysis may be greatly abbreviated and simplified. For unsymmetrical loading, welcome short-cuts are offered by the Method of Symmetry and Anti-Symmetry, also known as the B-U Method (B-U for Belastungsumordnung or loading rearrangement). Moreover, by using Anti-Symmetry alone, problems involving sidesway are reduced to attractive simplicity.

Although the following demonstrations utilize concepts developed in the writer's previous articles on "Graphic Methods" and "Moment Distribution by Linked Rigidities" (*ENR*, May 4, 1944, vol. p. 659, and June 1, 1944, vol. p. 802), the solutions given below may be applied to any other method of moment distribution.

For symmetrical loading on a symmetrical structure, the closing line (the line joining final end moments) in the middle span is horizontal, as represented in Fig. 1a by MM. *M"M"* is the initial closing line for fixed-end moments, and *U* and *V* on *M"M"*, located over the third points of the span, are the characteristic points.

The fixed point or conjugate point, *J*, is always located on the line *M'U* so as to divide its length (or its horizontal or vertical projection) in the ratio $r_1 : \frac{1}{2}r_2$ where r_2 is the rigidity (I/l) of the middle span and r_1 is the rigidity (or linked rigidity) of the spans and members to the left. Since the balanced closing line *MM* must pass through *J*, the unbalanced moment (*M"-M'*) must be distributed in the ratio $r_1 : \frac{1}{2}r_2$. Hence, the final moment distribution may be accomplished by using $\frac{1}{2}r_2$ instead of r_2 as the rigidity of the middle span, and stopping the work at the center line of the member.

Similarly, as shown in Fig. 1b, for anti-symmetrical loading on a symmetrical structure, the final moment distribution is directly accomplished by using 3/2 r_2 instead of r_2 as the rigidity of the middle span, and stopping the work at the center line.

The anti-symmetrical loading may also be pictured as equivalent to placing a hinged support at mid-span. The halving of the effective span multiplies *r* by 2, and the hinged support multiplies it by ¾, producing a resultant effective rigidity of 3/2 *r*.

The respective multipliers ½ and 3/2 are also given by the formulas for end-rotation constants. This concept is shown graphically in Fig. 2. For a given end rotation, represented by the ordinate *U*, the various predetermined slopes of the closing line determine the relative end moments at *A* and, therefore, the relative effective rigidity of member.

Symmetry and anti-symmetry

In Fig. 3, a symmetrical three-member bent is unsymmetrically loaded so as to produce fixed-end moments of 950 and 250 in the center member. By taking one-half the sum of these moments (600) and one-half the difference (350), the original fixed-end moments are resolved into a symmetrical component (600) and an anti-symmetrical component (350). For symmetrical loading, the

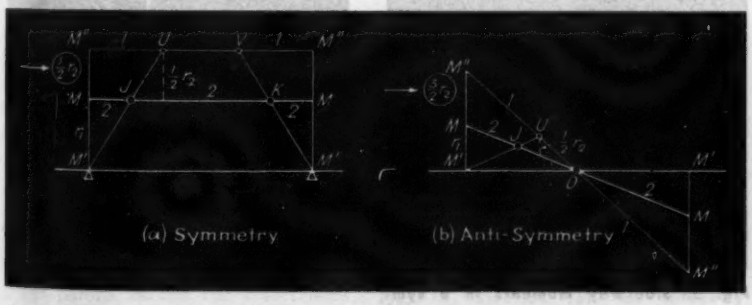


Fig. 1. Closing lines for symmetrical and anti-symmetrical loading, showing location of characteristic points and fixed points.

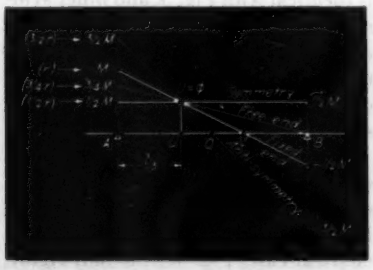


Fig. 2. The concept of end rotation constants in determining the relative effective rigidity of a member.

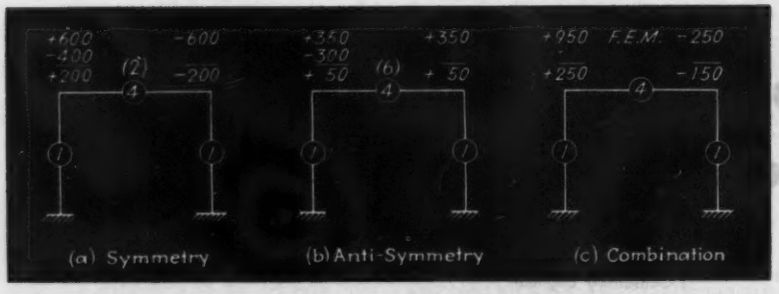


Fig. 3. Method of solution by resolving the fixed-end moments in the center member of a symmetrical bent into symmetrical and anti-symmetrical components.

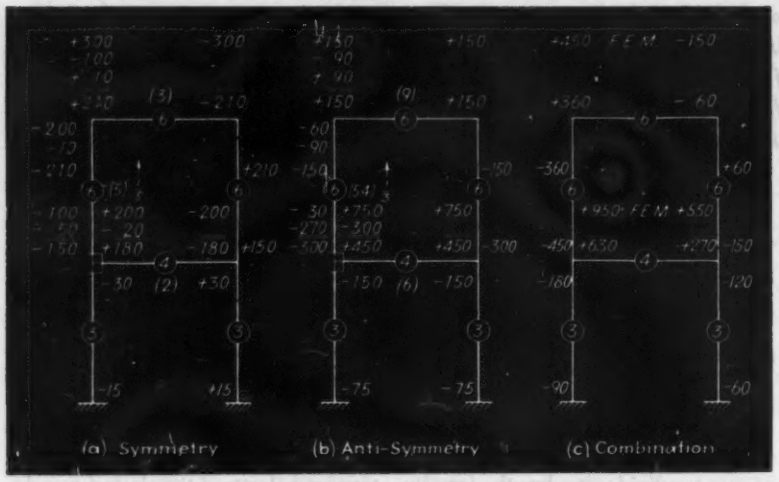


Fig. 4. Method of solution by resolving the fixed-end moments in the center members of a symmetrical, two-story bent into symmetrical and anti-symmetrical components.

complete solution is given in Fig. 3a. Only one moment distribution is required, using 2 instead of 4 as the relative rigidity of the middle member. For anti-symmetrical loading, the complete solution is given in Fig. 3b. Again, a single moment balance gives the answer, this time using $3/2 \times 4$, or 6, as the effective rigidity of the middle member. The combination of Figs. 3a and 3b, yielding the final solution, is recorded in Fig. 3c.

For a three-span beam, the solution is identical with Fig. 3, and other symmetrical structures may be solved in a similar way. The numerical work may be arranged on a single diagram, conveniently using one-half of the structure for each component loading.

The corresponding solution for a symmetrical two-story bent, with both stories unsymmetrically loaded, is illustrated in Fig. 4. For the symmetrical case, Fig. 4a, the half-rigidities 3 and 2 are used instead of 6 and 4 for the middle members. The moments in one half of the structure may then be distributed by the conventional procedure; or, by using linked rigidities ($r_1 = 3$, $r_2 = 6$; therefore, $r_{1,2} = 5$, and $c = 1/5$), one moment balance at each of the two joints completes the solution. For the anti-symmetrical case, Fig. 4b, the augmented rigidities 9 and 6 are used instead of 6 and 4 for the middle members; and, by using linked rigidities ($r_1 = 9$, $r_2 = 6$, hence $r_{1,2} = 5.4$ and $c = 1/3$), the balanced moments are quickly obtained. The original fixed-end moments and the summations of the balanced moments are recorded in Fig. 4c.

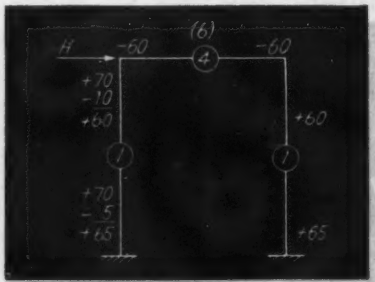


Fig. 5. Sidesway moments in a symmetrical bent determined by applying anti-symmetrical loading.

In symmetrical structures with an even number of spans or bays, no modification of the r-values is required; and corresponding shortcuts, using only one-half of the structure, are available.

Application to sidesway

Sidesway problems (sidesway correction and horizontal loading) are easily solved as applications of anti-symmetrical loading. Fig. 5 shows the solution for a three-member bent with fixed ends. The value of r_2 is multiplied by 3/2, and a single moment balance gives the answer.

Abstracted from Fig. 5, the geometric relations locating the node points, or points of zero moment, in the symmetrical columns are recorded in Fig. 6. With the three node points located, including N_2 at mid-span, the relative moments at the four corners may be written directly, without going through any moment distribution.

The sidesway solution for a symmetrical 3-bay bent is shown in Fig. 7. The initial fixed-end moments in the columns are proportional to their values of r/h. The middle r is multiplied by 3/2, so that one-half of the structure is eliminated from the operation. Only one linked rigidity is required.

For a closed rectangular frame, the sidesway solution is given in Fig. 8. The rigidities 2 and 10 of the horizontal members are replaced by 3 and 15. Only one linked rigidity is used. The assumed initial fixed-end moment is 300 at top and bottom of each column.

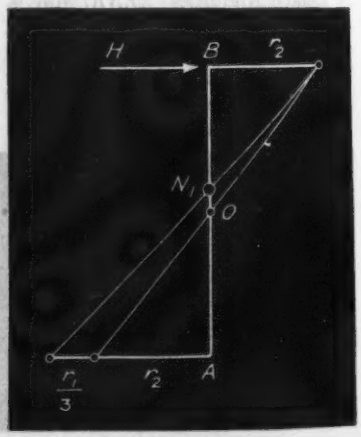


Fig. 6. Graphical location of node points in a symmetrical bent.

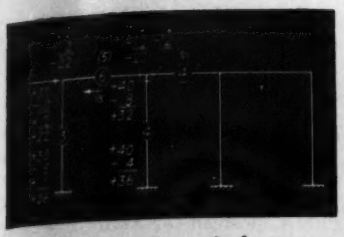


Fig. 7. Sidesway moments in a symmetrical, three-bay bent determined by applying anti-symmetrical loading.

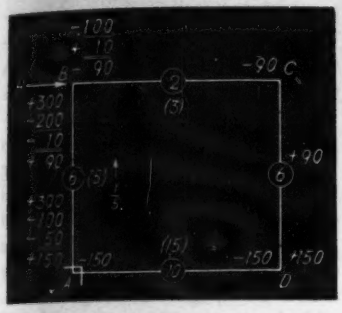


Fig. 8. Sidesway moments in a symmetrical, closed frame determined by applying anti-symmetrical loading.

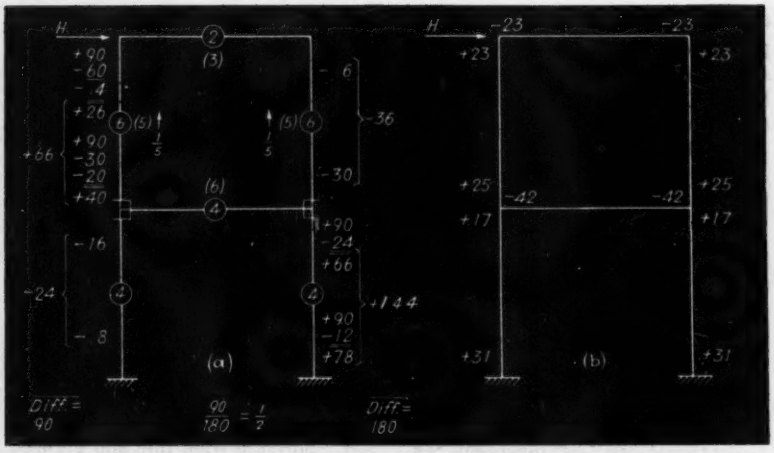


Fig. 9. Sidesway moments in a symmetrical, two-story bent determined by applying anti-symmetrical loading.

After the simple moment distribution and carry-over, the final relative end moments are 90 at the top and 150 at the bottom.

For a two-story bent, commonly regarded as a difficult case, the complete sidesway solution is shown in Fig. 9. A direct method is presented, eliminating the usual procedure of successive trials and corrections. Any convenient fixed-end moment (90) is applied at the top and bottom of the upper column, and is distributed as in the foregoing examples, using $3/2\ r$ for the horizontal members. The same fixed-end moment (or any other) is then applied at the top and bottom of the lower column, and distributed in the same manner. (This is equivalent to applying horizontal shears *separately* across the two stories.)

Conveniently, the two sides of the diagram (Fig. 9a) are used for the two component solutions. The difference between the sum of the end moments in the upper column and the sum of the end moments in the lower column on the left side of the diagram is 90; on the right side, the difference is 180; the ratio is $\frac{1}{2}$. (If the two stories are of different height, the sum of the end moments for each column is divided by the respective relative height before taking the differences and finding their ratio.) The end moments on the right side of the diagram are then multiplied by this ratio ($\frac{1}{2}$) and added to the corresponding end moments on the left side of the diagram to obtain the total balanced end moments. These are recorded in Fig. 9b. By this procedure, the horizontal shears (H) across the two stories are equalized ($96 = 96$, for equal column heights). The identical solution may be used for "broken-story" bents. The same method of solution may also be used for symmetrical bents of more than two stories, using simple equations for balancing the respective horizontal shears. This also constitutes a convenient solution for Vierendeel trusses.

Abbreviated method for sidesway

Referring to the ratios recorded in Fig. 6, the location of the node points in the fixed columns of a symmetrical three-member bent is given by

$$n_1 = \frac{M_B}{M_A} = \frac{BN_1}{AN_1} = \frac{3r_2}{3r_2 + r_1} = f_2 \qquad (1)$$

where f_2 is the moment distribution factor for the horizontal member at Joint B, using $3r_2$ instead of r_2 as the rigidity of that member.

Similarly, for a closed rectangular frame, the ratios of the moment distributions exemplified in Fig. 8 yield

$$n_1 = \frac{M_B}{M_A} = \frac{BN_1}{AN_1} = \frac{3r_2/(3r_2 + r_1)}{3r_4/(3r_4 + r_1)} = \frac{f_2}{f_4} \qquad (2)$$

where f_2 and f_4 are the moment distribution factors for the horizontal members, provided their rigidities (r_2 and r_4) are multiplied by 3. If r_4 is infinitely large, the closed frame reduces to an open frame with fixed ends, and Eq. (2) reduces to Eq. (1) as a special case.

These relations yield a further abridgment of the foregoing solutions of sidesway problems (Figs. 5 and 8), if further simplification is desired. All that is necessary is to *multiply the rigidities of the horizontal members by three.* If that is done, no linked rigidities are required, and all moment carry-overs are eliminated.

To be strictly accurate, the multiplier 3 should be interpreted as the equivalent ratio of two respective multipliers, namely 3/2 for the horizontal members and $\frac{1}{2}$ for the ver-

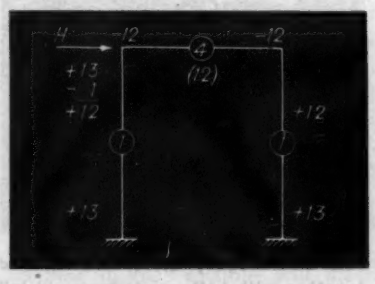


Fig. 10. Solution for the sidesway moments in a symmetrical bent by the abbreviated method.

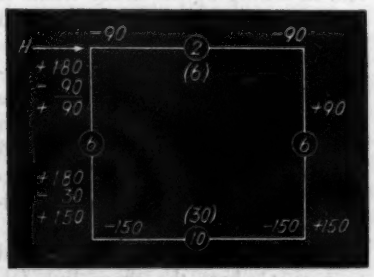


Fig. 11. Solution for the sidesway moments in a symmetrical, closed frame by the abbreviated method.

ticals. For the simple problems here presented, however, the use of the single multiplier 3 seems preferable, being more convenient to apply and easier to remember.

The abridged solution for the three-member bent of Fig. 5 is given in Fig. 10. The sum of r_1 and r_2, using 12 instead of 4 for r_2, suggests 13 as a convenient fixed-end moment. A single moment balance at the joint yields the desired relative end moments, 12 and 13.

The corresponding abbreviated solution for the closed rectangular frame of Fig. 8 is given in Fig. 11. The rigidities of the horizontal members are multiplied by 3. Equal fixed-end moments (180) are applied and distributed at each joint, yielding directly the desired relative end moments (90 and 150). No successive approximations — no carry-overs — no linked rigidities. The solution is reduced to an irreducible minimum.

In all of the foregoing examples, limited to symmetrical structures, the columns may be symmetrically inclined. instead of vertical, without altering the solutions.

Solid Mahogany Piledriver Rig

FAR REMOVED from any source of conventional supplies, ingenious Seabees out in the Pacific used such material as there was at hand in putting together a piledriver rig that not only did its job well, but later was twice dissembled and moved to other essential jobs.

On the island where this rig was put together plenty of mahogany was available. The windbracers or front legs had been previously trimmed and seasoned by Chinese workmen for use as ships' masts by a Dutch shipping company. Leads, 53 ft. long, also of mahogany, were fashioned to accommodate a 2,500-lb. drop hammer. For the back braces of the frame 5x8-in. timbers were selected from pieces of this size that had been used by the Australians in timbering over their pontoon barges. The head frame consists chiefly of a 9x25-in. solid mahogany piece measuring about 8 ft. long.

Bolts that would hold these large, heavy timbers together were not available in the stock of supplies. However, there was an old abandoned jail nearby whose bars were found to be excellent material for bolts. The heads and the threads were made at the site.

With no derrick to use for erection there would be a considerable problem in setting up the heavy frame if it were assembled horizontally. Speed of assembly, however, dictated putting the members together in a horizontal position on the beach. The frame was then shoved out over a barge at low tide and there rested, still in a horizontal position, with the bottom of the upright members extending over one side of the barge.

At high tide the barge was towed to a spot where the shore line followed a bank and the bottom sloped so that full advantage could be taken of the 15-ft. drop in tide. The barge was moored at high tide and allowed to tilt as the tide receded until, at low tide, the pontoon cell barge, which was to be the permanent support, could be floated in under the projecting footings.

From the top of the now inclined frame, two lines were carried to tractors on shore. The first went direct and the second was passed through a sheave on the far side of the pontoon barge. When this second line was pulled, with two footings in place on the barge, the frame was swung upward toward a vertical position. The line that passed directly ashore served as a hold-back and prevented the frame from going past the vertical position. The two tractors worked together until all four footings could be fastened exactly in place.

Hoist equipment for the barge, not available when the frame was assembled and erected, includes a three-drum hoist in which two of the drums operate the hammer and the pile lines while the third serves one of the forward quarter lines. Two other drums borrowed from a stiff-leg derrick rig were also mounted on the hoist and one was used to operate the second forward quarter line. All these drums were supplied with power by a heavy-duty gasoline engine which, with its transmission, was salvaged from a bombed motor truck. The two stern lines were operated by a separate small hoist with two drums, driven by a gasoline engine.

This all-mahogany driver frame, held together with bolts made from old jail bars, drove 3-ton wood piles that wouldn't float.

This driver rig successfully drove piles, well over 2,000 of them, in three wharves. For moves between jobs, one of which was 2,500 miles, the frame was twice completely taken down, the pieces marked for reassembly, put aboard ship and later put together at the new site.

Piles driven, in addition to some creosoted Douglas fir shipped from the mainland, included mahogany and Australian turpentine weighing up to 3 tons apiece. On one occasion the crew came on the job in the morning to find that a wooden barge loaded with piles had disappeared in the night. The barge had sprung a leak and was on the bottom in 25 ft. of water, weighted down by thirty 60-ft. piles whose specific gravity was so high that they would not float.

A diver was sent down with a choker line and from this submarine stock-pile piles were pulled to the leads one at a time, as needed. Eventually the barge was floated, beached at high tide and pumped out.

This driver was built by Company A, 55th Naval Construction Battalion, Comdr. Jay S. Leland, Belt, Mont., officer in charge. Lieut. John N. Spaulding commanded Company A and Chief Carpenter's Mate Fiveash headed the crew that built and used the driver.

Fig. 1. Separated by central control rooms, two groups of twin cells house airplane propeller test torque stands.

Propeller Torque Stands of Record Size

***Contents in Brief**—At an army airbase, four 169-ft. long reinforced-concrete cells, each providing a venturi section 45 ft. square at the ends and 42 ft. in diameter at the throat were constructed to test airplane propellers. Test engines are supported in the circular sections on streamlined, reinforced-concrete piers carried to rock and insulated from the cell floor. Control rooms are located between two cell groups of two cells each.*

INCLUDED in the many special buildings, constructed at Wright Field Dayton, Ohio, are four reinforced-concrete test cells believed to be the largest of their type in this country. Built to permit extensive high-speed tests with air plane propellers of large size, the cells required special measures to eliminate vibration. Form work, also, was a major problem.

Known as propeller test torque stands in airplane testing language, the four cells are arranged in groups of two (Fig. 1), with common control rooms between, and with a 16x20-ft. exhaust tunnel about 212 ft. long running under the structure for its full length. Each two-cell unit, measuring 95x169 ft. in plan and 60 ft. in height was designed as a rigid-frame. The exterior walls, which vary from 20 to 22 in. in thickness, are doubly reinforced, and the roof is inverted, beam-and-slab construction to provide a smooth ceiling.

Curved concrete walls 12 in. thick were added inside the exterior walls to create in each cell a venturi section 45 ft. square at the ends and of 42-ft. throat diameter (Fig. 2). In this throat are located the streamlined reinforced-concrete piers or test blocks that support the airplane engine equipped with the propeller to be tested. To control vibration the piers were made independent of the floor of the cell, being carried on separate footings resting on rock. Passage of impact and vibration from the piers to the walls is eliminated by a 3-in. pressed, granulated cork cushion set in hot asphalt between the pier and the walls at all points (Fig. 3). Transfer of impact to the foundation rock is reduced by a sand cushion.

Both ends of the cells are closed with 45x45-ft. vertical-lift doors assembled in four sections and made of steel sheeting backed up with glass wool insulation. The first 25 ft. of space at each end of the cells consists of 4-in. thick, vertical, acoustical baffles on 18-in. centers. Slightly skewed with respect to the centerline of the cell to be more effective in absorbing the noise developed by the test work, the baffles consist of perforated 18-gage, galvanized metal welded to steel channels, with the intermediate space filled with rock wool.

In a 40-ft. wide space between the two cell groups are located the control rooms in a two-story structure of the same length as the cells. An outstanding feature of the control rooms is that the slab-and-beam floors and roof are supported on wall brackets equipped with lead and steel bearing plates so that in the horizontal plane they may move independently of the cell walls (Fig. 3).

Construction of the cells was difficult because of the problems encountered in detailing and constructing the forms and in placing the concrete. The manner of solution is illustrated by the step-by-step procedure in building one cell: After the footings were constructed to floor level, the floor was put down and the three streamlined piers were built. The lower 4½ ft. of the exterior walls was

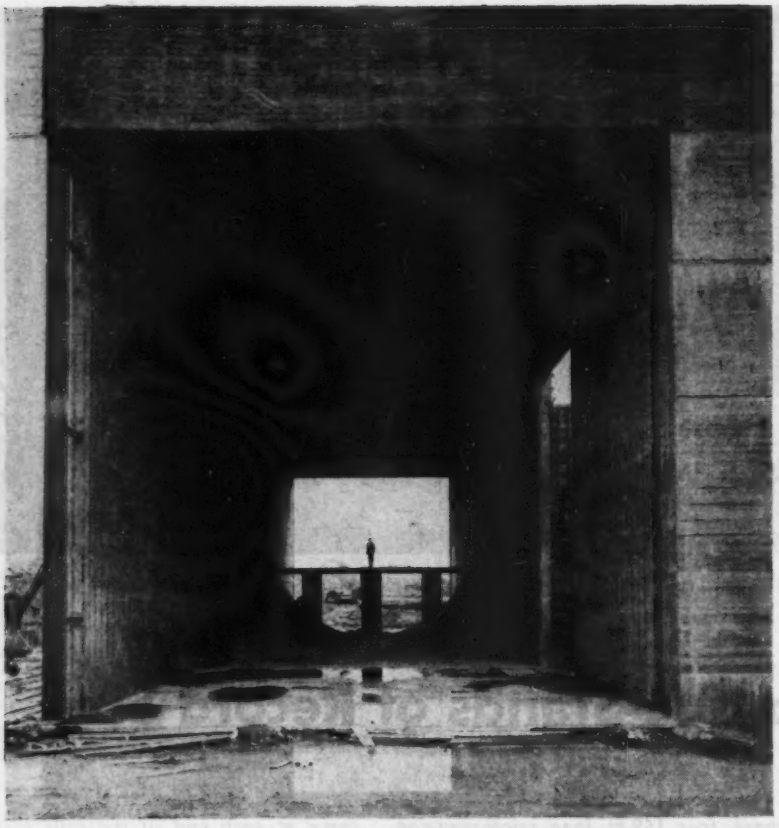
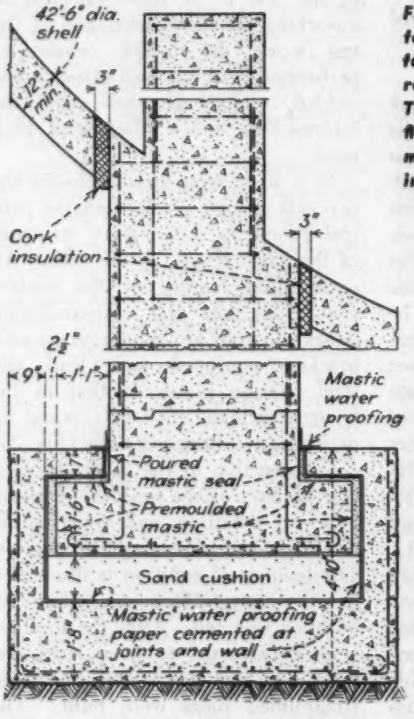
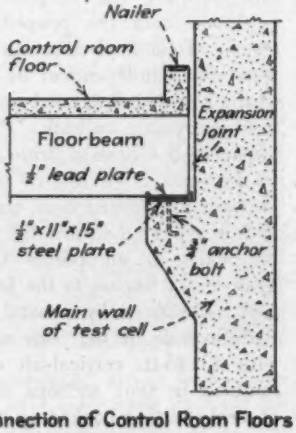


Fig. 2. This end view of a typical cell illustrates the immense size of the venturi section. Steel vertical-lift doors and sound absorbing baffles will be installed at each end.



Footing for Streamlined Piers

Fig. 3. The amount of vibration transfered to the cell walls and to the foundation rock from the test piers was reduced by insulation of the footings. The support shown at right permits the floors and roof of the control rooms to move independently of the cell walls in the horizontal plane.



Connection of Control Room Floors to Walls of Test Cell

constructed and then, the exterior walls and the curved interior walls for the venturi section were carried up to the bottom edge of the roof beams in 10-ft. high lifts, with vertical control joints on 25-ft. centers. After that, the roof slab was added, the penthouse above the vertical-lift doors at each end constructed, the end doors installed and, finally, 8-in. thick horizontal timbers about 8 ft. long, (planned to protect the cell walls from flying fragments in case a propellor breaks loose during a test) were installed in the throat section.

A 2½-in. slump concrete made with ordinary portland cement and 1½-in. maximum size aggregate was used throughout. Delivered by truck-mounted mixers, the concrete was placed with bottom-dump buckets handled by a crawler crane and vibrated in place with internal vibrators.

Formwork for the four cells required 540,000 b.ft. of yellow pine lumber and 65,700 sq. ft. of ¾-in. thick plywood. For the vertical walls the interior forms consisted of 2x4-in. timbers on a 2-ft. spacing covered with the ¾-in. plywood. The exterior forms were made of horizontal, undressed boards of 6-, 8-, 10- and 12-in. width nailed to 2x4-in. studs in a random arrangement, but with each width of board carried the complete length of the wall. Walers for the exterior wall forms consisted of two 2x6-in. timbers.

Forms for the circular sections consisted of ¾-in. plywood over ribs cut out of 2x12-in. timbers and spaced 2-ft. on centers. For the lower portion of the curved walls no top forms were needed, as the slopes are not steep, but as the curved walls approached the vertical, forms were required on the inside and great care had to be exercised to anchor these forms because of the forces created in vibrating the concrete into place.

The $1,060,000 structure was built by the Corps of Engineers with Col. Edwin C. Landberg, district engineer for the Wright Field district, in direct charge of the work under the general supervision of Col. Charles L. Hall, division engineer, Ohio River Division.

Ferro Concrete Construction Co., Cincinnati, with Harry Harrison, superintendent, was the contractor. The Cincinnati Mfg. Co., a subcontractor, installed the baffles.

From Field and Office

WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Wide Road-Side Ditches

Rainfall in the New Hebrides is so heavy that it is necessary to have very large capacity in side ditches if highways are to be provided with adequate drainage. A common procedure is to excavate these ditches with carrying scrapers, cutting to a width of 6 or 8 ft., as shown in the accompanying picture.

It has been suggested that in the jungle where rainfall is heavy the quickest and best method in the preparation of any large area where considerable development is contemplated is to go in first with carrying scrapers on lines, say, 100 ft. apart, cutting ditches wide enough for these

Road-side ditches in the New Hebrides made by carrying-scrapers.

scrapers to run through and deep enough to provide adequate drainage. Ditches of this width can be easily maintained by running the scrapers through them occasionally.—N.A.B.

Mine Detector Saves Saw Teeth

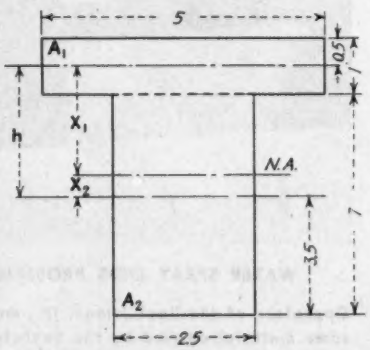
In sawmills operated by the Seabees for cutting logs from forests that have been heavily shelled and bombed, there is a considerable menace to the teeth of circular saws from bomb and shell fragments embedded in the wood. Experience suggested the advisability of finding and removing these fragments before risking the saws. Accordingly, a standard mine detector

Saw logs are "explored" with a mine detector to locate shrapnel fragments.

was requisitioned and is used to carefully "explore" for any metallic substances. Where the presence of metal is indicated an axeman cuts out the fragment. Then the spot is again checked by the detector to make sure all fragments are out before the crew moves on.—N.A.B.

Moment of Inertia of Two-Part Section

In computing the moment of inertia of common structural sections composed of two parts, such as T's or L's, the following simple formula, which is easy to memorize, has been



found very useful because it saves a step in calculation by avoiding the computation of the location of the neutral axis.

$$I = I_1 + I_2 + \frac{A_1 A_2}{A_1 + A_2} h^2,$$

where I is the moment of inertia of the entire section, I_1 the moment of inertia of area A_1 about its center of gravity, I_2 the moment of inertia of area A_2 about its center of gravity and h the distance between these gravity axes. This formula is derived from the combination of $I = I_1 + I_2 + A_1 X^2_1 + A_2 X^2_2$ and $A_1 X_1 + A_2 X_2 = 0$, where X_1 and X_2 are, respectively, the moment arms of A_1 and A_2 with respect to the center of gravity of the entire section.

For example, the moment of inertia of the T-section shown is:

$$I = \frac{5(1)^3}{12} + \frac{2.5(7)^3}{12} + \frac{5 \times 17.5}{22.5}(4)^2 = 134.1.$$

H. A. Pezzuti
New York, N. Y.

Testing Well by Reverse Method

A novel method of testing a well in underlying limestone was used near Brooksville, Fla., where construction of a large stone quarry plant required a water supply of about 2,800 gpm.

for washing the stone. Based on the thought that if a well could give out a large volume of water it should be able to take it in, the test might well be called a "reverse flow" method.

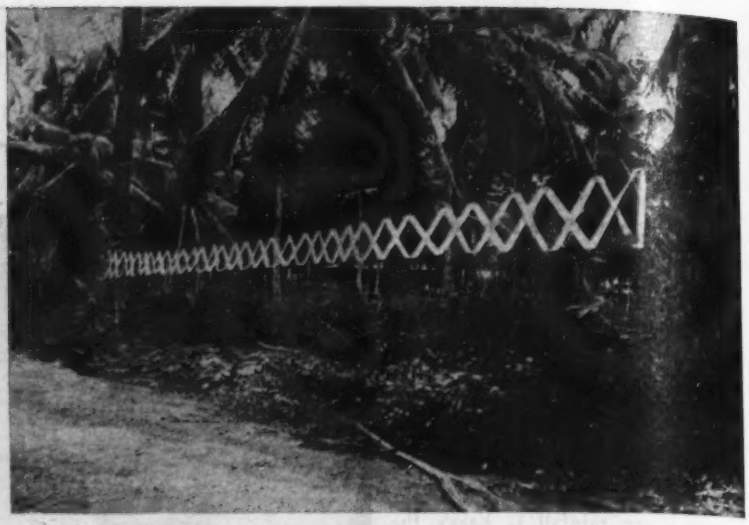
The well to be tested was churn drilled into the limestone underlying that part of Florida, where it is customary to drill until the tools strike a cavity of sufficient depth to indicate a large water supply. The first 150 ft. of the well was of 22-in. diameter, the remainder of 12 in. When a depth of 600 ft. had been reached it was noted that the water level stood constant in the pipe at about 83 ft. below ground level. This seemed to indicate that the well was connected to a sizable water supply. It was now necessary to be reasonably sure that ample flow was available before sending for installation personnel. This was accomplished as follows:

A small gasoline-driven booster pump forced 15,000 gal. of water from a farmer's well about a half mile distant to a 25,000 gal. tank which had been erected over the new well during the drilling. The bottom of the tank was 112 ft. above the ground and from it a 14-in. pipe, valved at the bottom, was fitted to discharge exactly over the well after moving the drill rig out of the way.

When all was ready, a man opened the valve as fast as he could, then ran. The 15,000 gallons roared down into the well in less than two minutes. As soon as flow stopped, the water level in the well was measured and found to be constant at 83 ft. This test seemed to be conclusive; if the well could take in 15,000 gal. in less than two minutes it certainly should give out 2,800 gal. per min. The pump, a multi-vane centrifugal with the suction 140 ft. deep, was installed and has been operating successfully since.

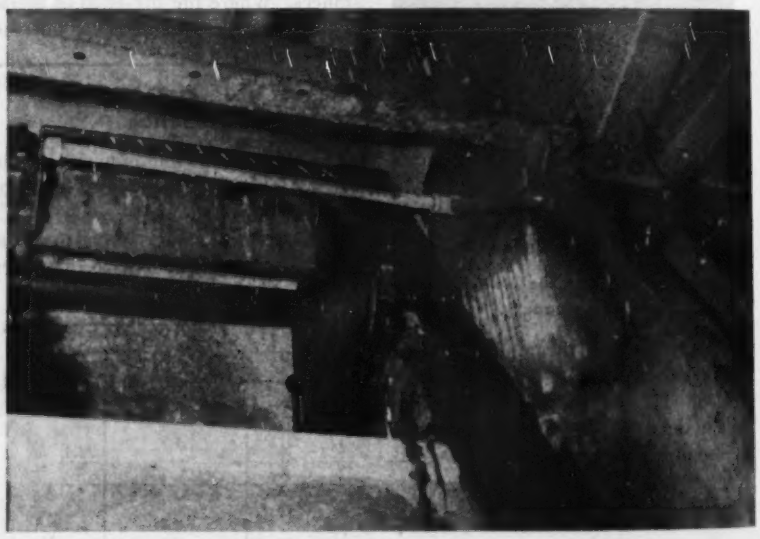
Markers of Wire and Canvas

Markers that clearly indicate road limits, widely used on road systems built by our forces in the Solomon Islands, are made of wire, usually barbed, and strips of canvas. Sometimes two canvas strips are used, as in the accompanying illustration. Along less important routes and where material is scarce, the markers can be made with the single strip that would remain if one of the two in the picture was removed. The supporting wires are usually somewhat farther apart near the supports than at the center.



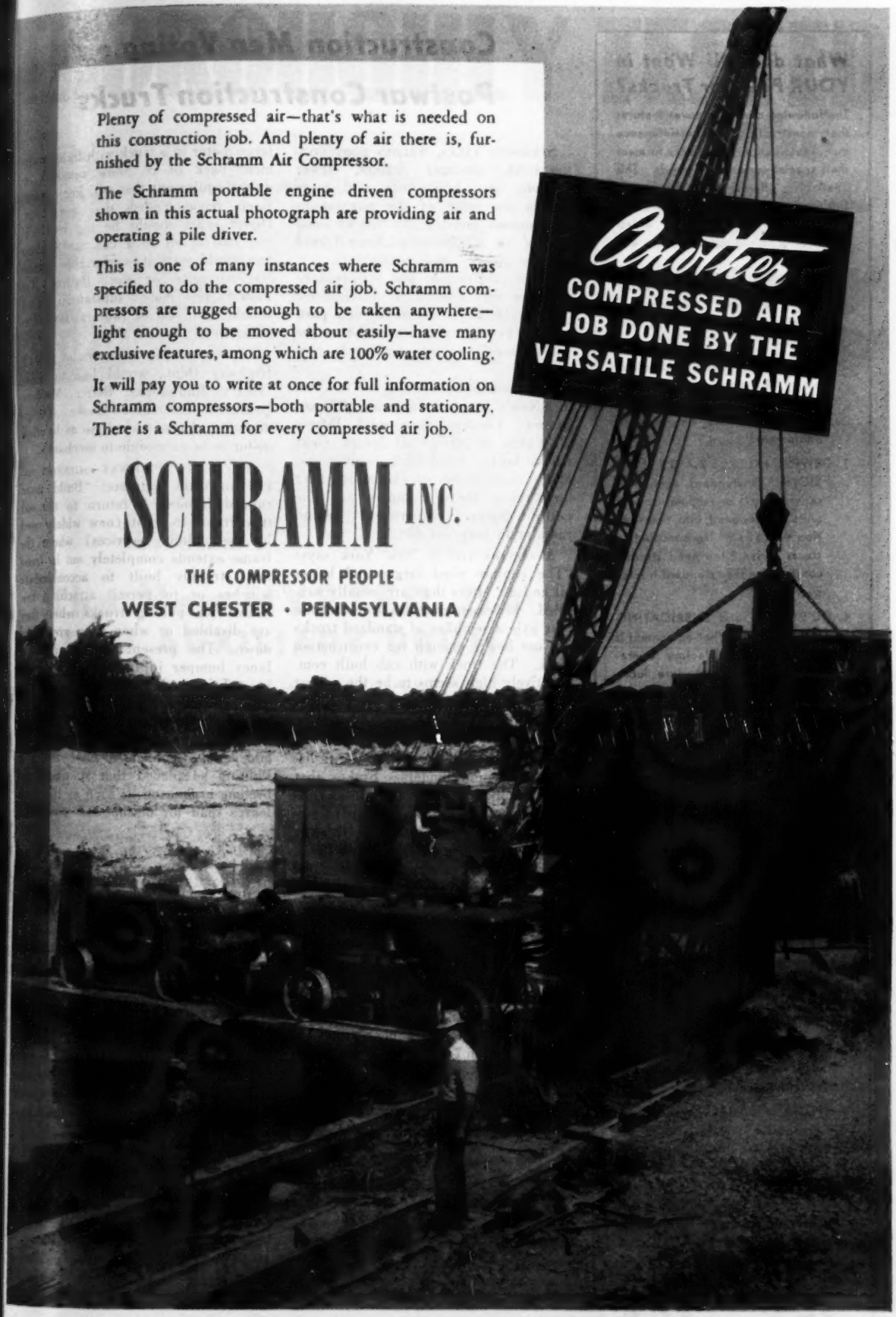
Roadside markers that are widely used in the Solomon Islands.

Throughout the Solomon Islands the roads are nearly always through dense jungle growth or coconut plantations. In either case roadside tree trunks serve as supports for the markers and it is rarely necessary to put in posts. Not only are the markers useful as guides to drivers during blackouts and to indicate the route to be followed where roads are only partially completed, but they also serve an important purpose in preventing mosquito breeding. Frequent rains keep the ground soft and when a truck leaves the road its tires make deep tracks that invariable retain pools of water ideal for mosquito breeding.



WATER SPRAY ENDS PROBLEM IN OPERATING TREATMENT PLANT

Operators of the Rock Island, Ill., municipal sewage treatment plant found that some material carried by the buckets attached to the endless chains in the grit removal chamber failed to leave the buckets at the discharge point, thus permitting some grit to pass beyond the chamber. This difficulty was overcome by directing a water spray against the buckets just after they started their downward trip, as shown above. A "protected" source of water was used for the spray to safeguard against pollution of the city's water supply. The installation was made under the general direction of W. J. Gallagher, director of public works at Rock Island.



Plenty of compressed air—that's what is needed on this construction job. And plenty of air there is, furnished by the Schramm Air Compressor.

The Schramm portable engine driven compressors shown in this actual photograph are providing air and operating a pile driver.

This is one of many instances where Schramm was specified to do the compressed air job. Schramm compressors are rugged enough to be taken anywhere—light enough to be moved about easily—have many exclusive features, among which are 100% water cooling.

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What do YOU Want in YOUR Postwar Trucks?

The following questions cover features that construction and maintenance men would like in their trucks to meet their special construction needs. This "ballot" is offered to the readers of *Engineering News-Record* to give engineers and contractors the widest opportunity to express their ideas and preferences.

1. **SIZE OF TRUCK:** Are trucks under 2-ton- or over best for construction jobs? Qualify by type of job.
2. **ENGINES:** Are gasoline or diesel engines more satisfactory for trucks under 2-ton? over 2-ton? Should governors be standard equipment?
3. **DRIVES, AXLES, TRANSMISSIONS:** Is standard equipment satisfactory? or should special units be designed into construction trucks? Do construction trucks under 2-ton need sturdier construction than standard trucks? over 2-ton?
4. **FUELING and LUBRICATING EQUIPMENT:** What equipment is needed for satisfactory operation, oil filters? pressure lubrication? anti-friction bearings? superchargers? Any difference in requirements for trucks under 2-ton? or over?
5. **BRAKES & TIRES:** What kind of brakes are needed? under 2-ton? over 2-ton? Are tires satisfactory? should they be larger, lower pressure? higher pressure?
6. **BODIES & CABS:** What body improvement are needed? Should cab comfort be improved? cab guards provided? seats improved? heaters? defrosters? summer cooling? power take-offs? winches?
7. **ELECTRICAL EQUIPMENT:** Are generators adequate? batteries?
8. **REPAIRS:** What parts need to be most accessible for replacement or adjustment?
9. **SPECIAL FEATURES:** What special equipment or features would you like that would make your trucks more useful as construction equipment?

Address replies to POSTWAR CONSTRUCTION TRUCK BALLOT, *Engineering News-Record*, 330 W. 42 St., New York 18, N. Y.

Construction Men Voting on Postwar Construction Trucks

STRONGER AXLES, WELDED BODY CONNECTIONS, stronger frames, fewer gadgets, less grill work and more guards are some of the suggestions for postwar construction trucks coming in to *Engineering News-Record* from engineers and contractors.

These construction and maintenance men are very specific in the features they would like to see in the new postwar trucks improved to meet better the "off-the-road" service peculiar to construction.

For example a GENERAL CONTRACTOR in New Jersey suggests: "Fewer gadgets. Fenders more solid. Recess all lights including tail lamps. Gear trucks lower. Weld body connections. Make doors solid so slamming don't break glass. Heavy bumpers. Seal the entire engine compartment behind radiator to keep out dirt."

A CONTRACTOR in New York says: "The engines need larger and better oil and air filters than are usually supplied. My experience has been that the rear axle assemblies of standard trucks are not heavy enough for construction work. The truck with cab built comparatively high seems to be the easiest to handle because it increases visibility in backing up."

A GENERAL CONTRACTOR in W. Va., wants: "Heavy duty cabs, hoods, radiator guards and fenders. Brakes that will give better service in off-the-road service. (Dirt and water tight). Renewable dump bed bottoms." He says, "Small trucks are equipped with handsome but fragile cabs, hoods, radiator grills, fenders, etc. These sell the truck but don't stand up in construction work. Construction work calls for these parts made along lines of U. S. Army trucks or something sturdy."

A COUNTY ENGINEER in Kansas says: "I believe truck winches will play an important part in trucks after war. 2-way radio would be a boon if within financial reach."

A CITY ENGINEER in Minnesota wants: "Better axles and transmissions. A small power operated winch of say one ton capacity would be a very useful extra on practically every truck."

A COUNTY ROAD ENGINEER in Michigan says: "Front end of the frame should be heavier and stronger. Bumper equipment should be heavier than most standard equipment. Depth of frame at front should be as strong as at the back end of the truck. Don't put a large motor in a truck with light equipment back of it. Snow removal requires equipment that will keep going. Keep recommended tire size large. Driver seats should be the best. If you had to sit in a cab for 8 hours you would want it comfortable regardless of price or size. Battery Box should be more substantial—truck should have one or two standard sizes of battery."

The EQUIPMENT ENGINEER of a State Highway Dept., would like to have: "Heavy Radiators. Better Mufflers. Improved Automatic Choke. Design motor or change chassis so as to allow motor to be accessible to mechanics."

A COUNTY HIGHWAY SUPERINTENDENT in Ohio suggests: "Build more rugged frames. A return to the old type frame in front (now widely used by the military services) where the frame extends completely out in front and strongly built to accommodate winches or to permit attaching tow chains for pulling trucks when they are disabled or when they are mired down. The present light frame and fancy bumper in front have no place in off-the-road construction trucks. The entire frame itself should be stronger and should be able to support any attachments that may be added. I would also have the rear lighting so placed that it would not become broken off as soon as the truck leaves road for off-the-road service."

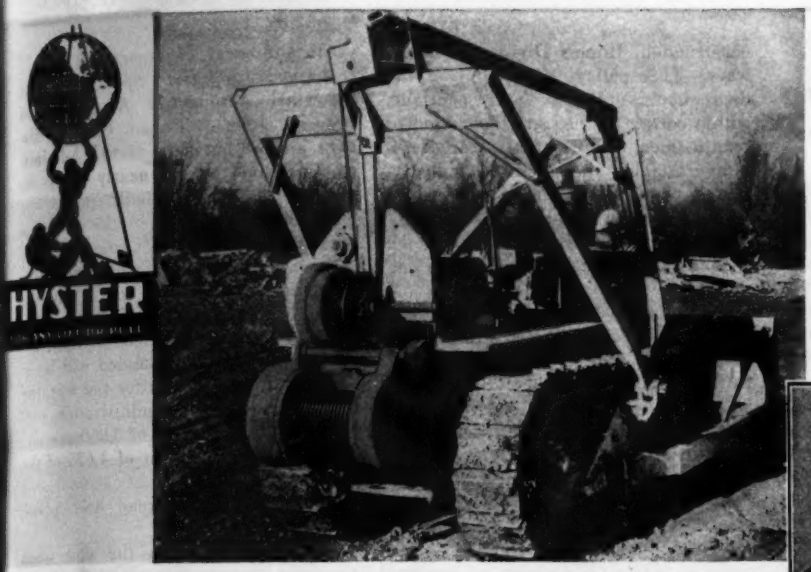
* * *

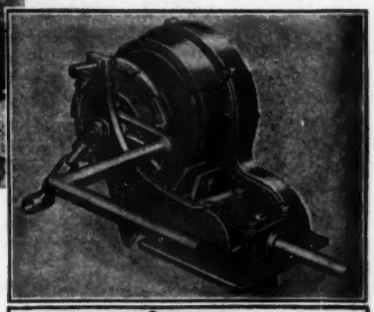
More trucks are used on construction than any other single class of equipment. Conversely construction uses more trucks than are used in any other single industry. So features construction men want in their trucks could be available as standard equipment if strong preferences are known.

Engineering News-Record accordingly invites construction truck users to make suggestions or express opinions on what they want in their postwar trucks. Results will be summarized in these pages.

To give you full opportunity to record your preferences the accompanying box contains questions covering truck features. Or, if you prefer, write us for a truck ballot form. Please send your "vote" on the features you want to Postwar Construction Truck Ballot, *Engineering News-Record*, 330 West 42nd. St., New York 18, N. Y.

THOROUGHLY TESTED *in the* FIELD *and* NOW READY





The New HYSTER D4
PCU AUXILIARY DRUM

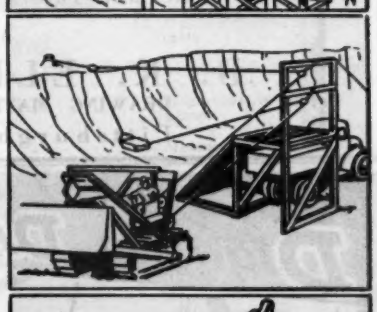
A Dozer Cable Control Unit with Many Other Uses - - -

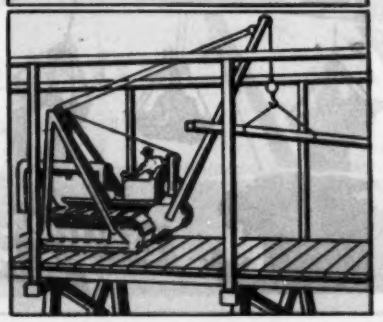
Here's GOOD NEWS for "Caterpillar" D4 tractor owners! HYSTER'S new PCU Auxiliary Drum is now available — ready to give your tractor its full working capacity. Combined with the powerful HYSTER D4 Winch, you can now have complete winch and cable control service.

COMPACT . . . SMOOTH WORKING . . . EASY TO OPERATE

This new auxiliary drum was especially designed as a bulldozer power control unit. It is friction-driven, compact and smooth-working. A single, quick-acting control lever, convenient to the driver, gives finger-tip response to the blade. The drum has more cable capacity for longer reaches. A positive-working drum ratchet provides for boom stopping; for holding loads suspended. A protected brake and clutch is removed from road dirt contact.

THERE IS ONLY ONE LUBRICATION FITTING on the entire unit. Driving mechanism is from winch transmission. Find out how many EXTRA towing and hoisting jobs your "Caterpillar" can do with this HYSTER combination. A new folder tells the story . . . Write for it.





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(Continued from page 77)

Illinois contractors discuss today's problems

Among the highlights of the talks and discussions at the meeting of the Illinois Contractors' Association in Springfield, Jan. 10-11, were the following:

Legislation: The Federal-Aid Highway Act of 1944 was called a "masterpiece of legislation" by H. E. Foreman, managing director of The Associated General Contractors of America, who said also that highway prospects are better than they have ever been. As to other legislation, he was of the opinion that the temptation to favor a project just for the jobs it may provide should be resisted; and that the present law affecting the handling of surplus equipment and material leaves much to be desired if the contracting industry is not to be injured. Though states may not want the surpluses, counties, cities and townships do.

Shall labor be obtained locally? asked C. M. Hathaway, engineer of construction, Illinois Division of Highways. This policy, timely during the depression, probably will continue, within certain limits, into the period of readjustment, but eventually, Mr. Hathaway thought, the highway industry, like any other, should be allowed to obtain qualified labor to its best economic advantage. Perhaps now is the time to consider fitting legislation along this line.

Tax diversion: A resolution was passed recommending that the association endorse and urge an amendment to the Illinois state constitution, to be submitted to the voters at the next election, prohibiting the further diversion of highway funds.

Planning: William Muirhead, president of The Associated General Contractors of America, emphasized the importance of the construction industry's acting as a pioneer in postwar activities. He urged plan advancement to the contract-letting stage, since planning sometimes takes longer than actual construction. The first task is not to find projects but to determine their worth and order of importance.

Airport program: Speaking about the Civil Aeronautics Administration program John J. Hogan, Chicago district airport engineer of the Administration, said that in nearly every instance the airports built under the $400,000,000 program of the last four years can be used in commercial aviation, and that all of them will serve a definite need after the war in addition to their military use.

To care for the 400,000 civilian airplanes which it is estimated will be in use within ten years after the war, the Civil Aeronautics Administration proposes the construction of 3,050 new airports and improvement of 1,625 of the 3,000 existing fields, at a total cost of $1,250,000,000, spread over a five to ten year period.

Looking forward to the time when the joint committee work of the American Association of State Highway Officials and the A.G.C. may be resumed, Mr. Hathaway, in his annual message, pointed to the vast variation in specifications among the states, usually laid

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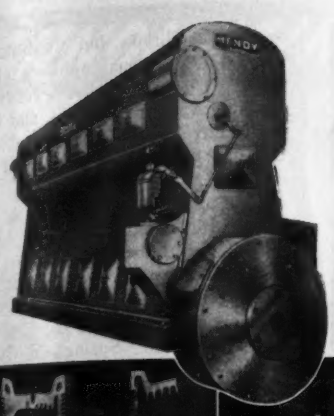
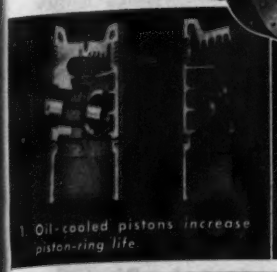
to local conditions, but often attrib...

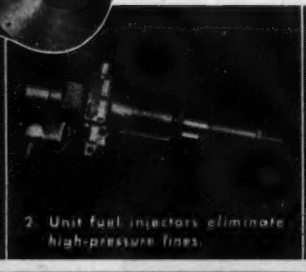


22 PROVEN DIESEL FEATURES

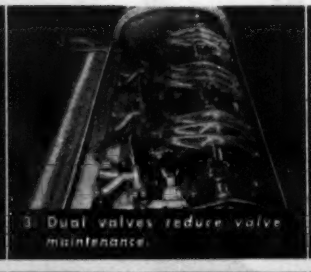
ONLY HENDY COMBINES THEM ALL



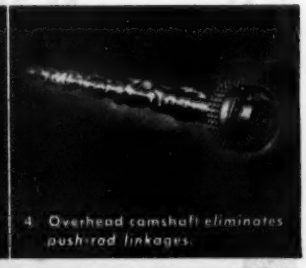
1. Oil-cooled pistons increase piston-ring life.



2. Unit fuel injectors eliminate high-pressure lines.



3. Dual valves reduce valve maintenance.

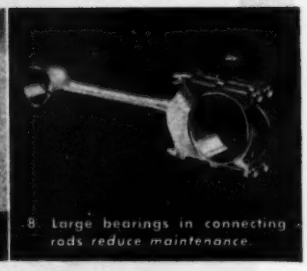


4. Overhead camshaft eliminates push-rod linkages.

5. Hydraulic tappets maintain correct clearances.

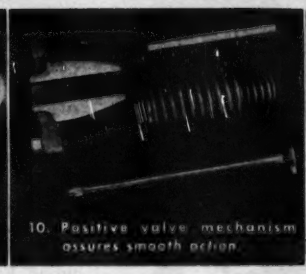
6. Large-diameter crankshaft for reliability.

7. Simplified controls aid easy operation.

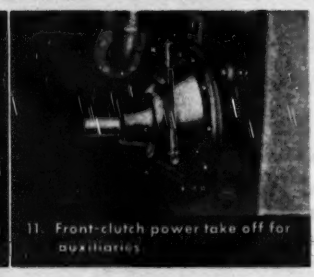


8. Large bearings in connecting rods reduce maintenance.

9. Welded steel bedplate assures great rigidity.



10. Positive valve mechanism assures smooth action.



11. Front-clutch power take off for auxiliaries.

OTHER FEATURES *not pictured here*

12. Removable main bearings
13. Double rear main bearings
14. Jet-action head cooling
15. Cage-type relief valves
16. Uniform-tension camshaft drive
17. Air-operated starting valve
18. Large-capacity cooling pumps
19. Mechanical or hydraulic governor
20. Water-cooled exhaust manifold
21. Fresh-water cooling
22. Full pressure lubrication

THE important fact about Hendy Diesels is that they combine, for the first time in a single engine, 22 of the most modern design features. Every one of these features was selected by Hendy engineers as a proven and practical development in Diesel design.

Only Hendy Diesels have all twenty-two! Examine the full list above—you are undoubtedly familiar with some—you'll want to know more about the others. Send for data available now on 6 or 8 cylinder Hendy Diesels from 350 to 675 hp, designed for a wide variety of industrial uses or with generators as complete electric plants.

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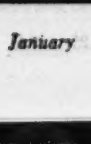
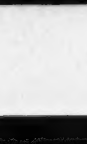
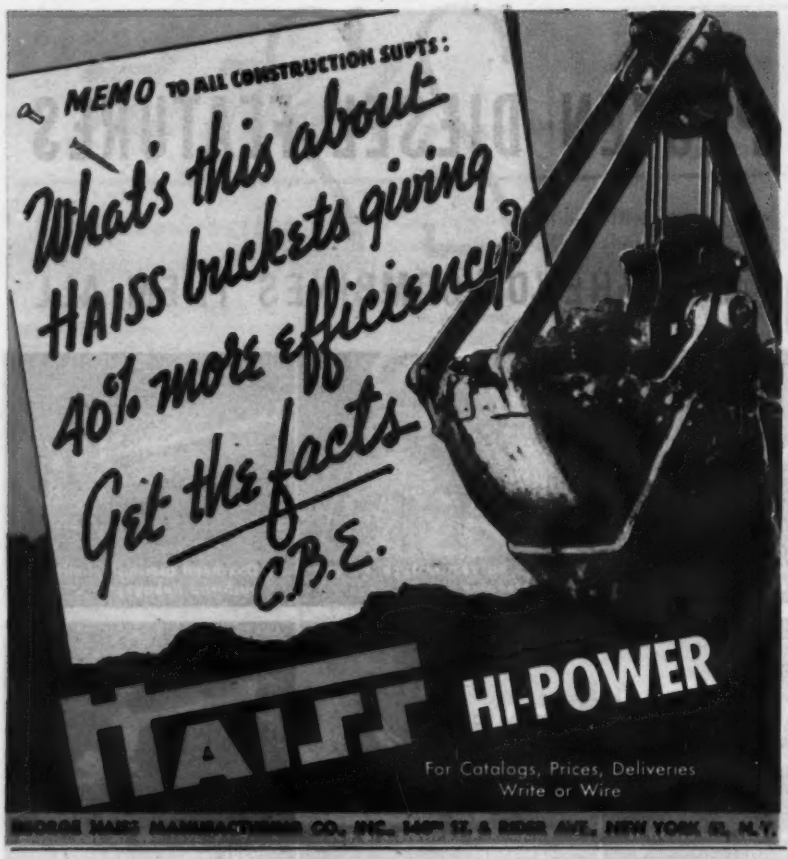


REDUCTION GEARS

STEAM TURBINES



DIESEL ENGINES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to local conditions, but often attributable to the personal opinions of engineers. The A.G.C. has already done valuable work in this field, and further uniformity probably will enable contractors to do better work at lower cost.

New officers: Henry Berenz, Berenz & Son, Bloomington, was elected president; and James F. Keeley, Keeley Bros., Contracting Co., East St. Louis, vice-president. Re-elected treasurer was Thomas H. Joyce, Jr., Joyce Bros. Contracting Co., Springfield. New directors are: T. E. Fieweger, Central Engineering Co., Davenport, Ia., and Frank Feutz, Paris, Ill., each chosen for a three-year term and C. J. Moritz, C. J. Moritz, Inc., Effingham, chosen to fill the two-year unexpired term of James F. Keeley. Milo P. Flickinger was renamed executive director.

. . .

Sacramento River water for San Joaquin Valley

Final location of the Delta Cross Channel of California's Central Valley Project, which will carry water from the Sacramento River across the Sacramento-Joaquin delta into the San Joaquin valley, has been determined by U. S. Bureau of Reclamation engineers, it was announced recently by Charles E. Carey, Sacramento regional director. The route selected generally follows the plan recommended by California State Engineer Edward Hyatt in 1933—crossing the Delta by natural channels.

Waters made available from the Sacramento River by storage behind Shasta Dam will be carried to the San Joaquin River lands in exchange for San Joaquin River water stored behind Friant Dam and diverted into the Madera and proposed Friant-Kern canals to the south.

According to the plan, Sacramento water will be directed into the Mokelumme River though an enlargement of Snodgrass Slough. Thence the water will be introduced into the delta through two main forks of the Mokelumme, then drawn through existing channels in the southern portion of the Delta, finally reaching the intake of the Delta-Mendota Canal near Tracy. Through the Delta-Mendota Canal it will be carried to Mendota Pool, about 110 miles south, and turned into the San Joaquin River.

Using natural channels for the crossing will enable work to start on the project, according to reclamation officials. Construction necessary includes a pumping plant at the head of Snodgrass Slough with a capacity of 10,000 cfs. to provide water to form a barrier against salt water intrusion, as well as for diversion into the Delta-Mendota Canal.

ANNOUNCING

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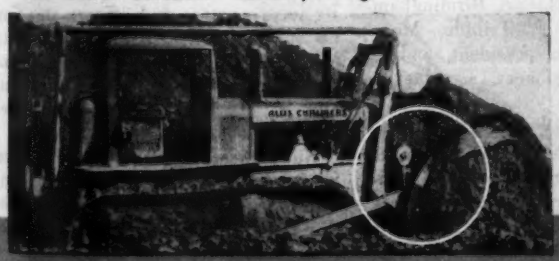

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Elections and Activities

R. P. Reece has been elected president of the Reynolds Engineering Club at Winston-Salem, N. C., succeeding H. E. Hastings. Others elected are: J. M. Cline, vice-president; Connie Green, treasurer; W. E. Norman, assistant treasurer; C. J. Watson, secretary; J. M. Parish, F. P. Flynt and Harvey Spell, members of the executive committee.

Officers of the Central Illinois branch of the American Society of Civil Engineers are H. A. Spafford, Springfield, president; T. C. Shedd, University of Illinois, first vice-president; L. E. Philbrook, Springfield, second vice-president; and Ralph B. Peck, University of Illinois, secretary-treasurer.

The Charlotte Engineers Club, Charlotte, N. C., has elected the following officers: Beaumert H. Whitton, president; G. E. Park, vice-president; Joe L. Greenlee, treasurer, and Charles M. Stone, secretary. The directors are: David Nabow, John E. Fox, C. W. Gilchrist, B. B. Parker, and H. B. Wolf.

Nello L. Teer, Jr., Durham, N. C., has been re-elected president of the Carolina Road Builders Association, Inc. Others elected are: E. H. Hines, Greenwood, S. C., vice-president Harry Willson, Raleigh, N. C., and Charles Yager, Columbia, S. C., were elected to the board of governors, and F. D. Cline of Raleigh, N. C., John R. Suber, Whitmire, S. C., T. R. Meekin, Cheraw, S. C., and W. E. Graham, Cleveland, N. C., were re-elected.

The Alabama Section of the American Society of Civil Engineers has elected A. Reese Harvey, Montgomery, president. Mr. Harvey is manager of the Alabama State Planning Board. Other officers are: T. E. Hobart, Birmingham, vice-president; J. F. Tribble, Montgomery, second vice-president, and T. H. Milford, Montgomery, secretary.

Wallace W. Sanders has been elected president of the Kentucky section of the American Society of Civil Engineers. He succeeds Walter S. Todd, Frankfort. Other officers named were: Vice-president, Prof. A. L. Chambers, Civil Engineering Department of the University of Kentucky, Lexington; secretary, Charles W. Lovell, of the Portland Cement Association, Louisville, and corresponding secretary, Earl Schaaf, U. S. Engineering Department, Louisville.

Herschel Hill, Illinois Division of Architecture and Engineering, was elected president of the Springfield chapter of the Illinois Society of Engineers for the ensuing year. Other officers are: Vice-president, C. T. Morrisett, chief architect, Federal Housing Administration; secretary, Jack Sidley, superintendent, City Water Light and Power; chapter representative, C. C. Wood, civil engineer, bridge department, Illinois Division of Highways.

B. F. Modglin, of MacDonald & Kahn, Inc., San Francisco, and Howard G. Huntley, of Piazza & Huntley, San Jose, who served in 1944, have been re-elected directors of the Northern California Chapter of the Associated General Contractors of America. New directors are: H. Earl Parker, Marysville; Lynn Schloss, Ransome Co., Oakland, and Lloyd Holton, manager Asphalt Sales Department, Associated Oil Co., San Francisco. Hold-over members are: M. H. Harkins, Oakland Sewer Construction Co., Walnut Creek; Chas. L. Harney, San Francisco; H. C. Magina, Calaveras Cement Co., San Francisco, and Ross A. Westbrook, Sacramento. Mr. Harney is president and Mr. Westbrook vice-president.

The Alabama Branch of the Associated General Contractors of America has elected Ralph A. Smallman, of the Smallman Construction Co. president. Other officers are: D. M. Prayter, president Kershaw Contracting Co., Birmingham, vice-president; Bob Dethlefs, president Dethlefs-Boozer Co., Anniston, second vice-president; W. E. Morris, Birmingham, treasurer and J. B. Rawls, Birmingham, secretary. W. J. R. Dunn and J. B. Owen, Birmingham, were elected directors.

The Texas Water Conservation Association, has been granted a state charter. Its incorporators and officers are: Guy C. Jackson, Jr., Anahuac, president; Max Starcke, Austin, first vice-president; John W. Fulbright, Beaumont, and A. M. Thompson, Humble, vice-presidents.

New officers for the San Francisco Section, American Society of Civil engineers, are: President, George D. Whittle; vice-president, S. T. Harding; secretary-treasurer, John E. Rinne.

The Tacoma, Wash., chapter of the American Society of Civil Engineers has elected: Ralph W. Finke, president; dent; John W. Fulbright, and A. M. Thompson, vice-presidents.

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LB. cranes equipped with magnets are doing an outstanding job in handling scrap iron in steel mills. The Monitor type cab on LB. cranes, allowing the operator 360° visibility, is proving a vital factor in speeding material handling.

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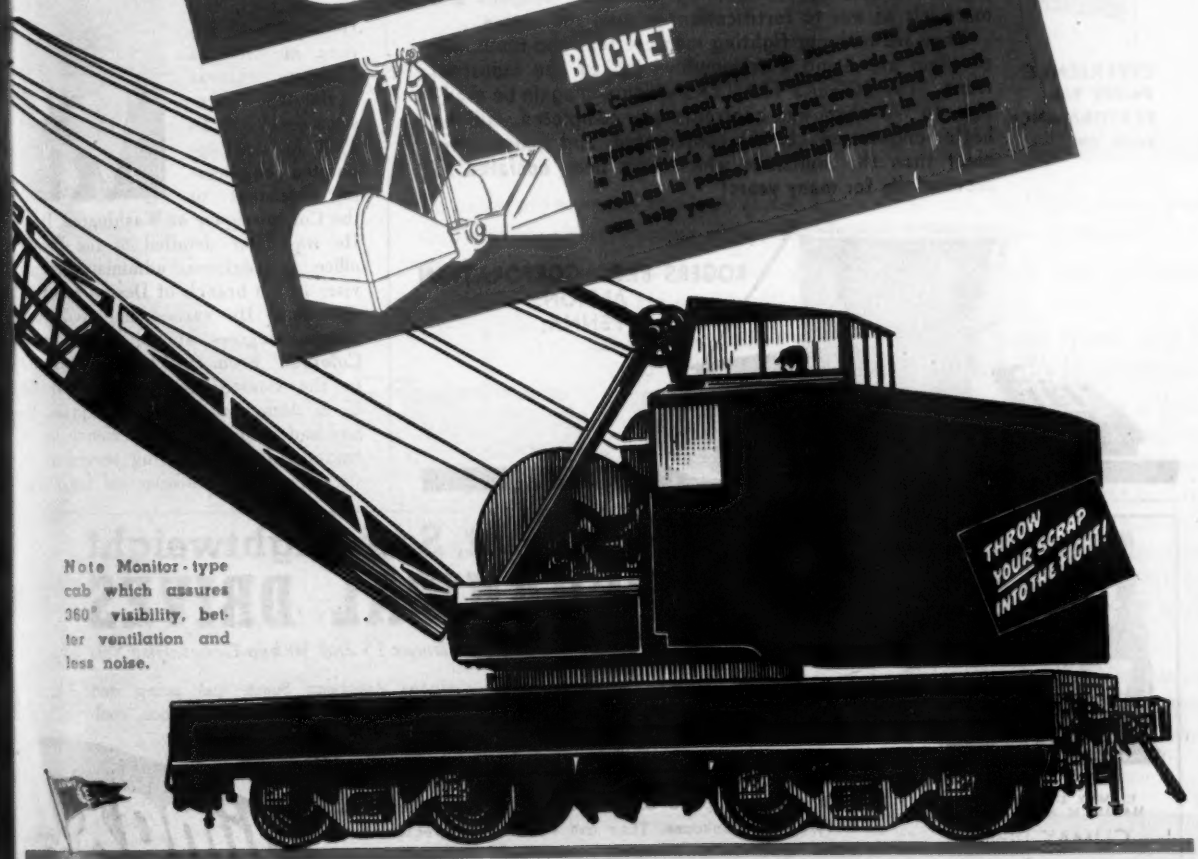

Note Monitor-type cab which assures 360° visibility, better ventilation and less noise.

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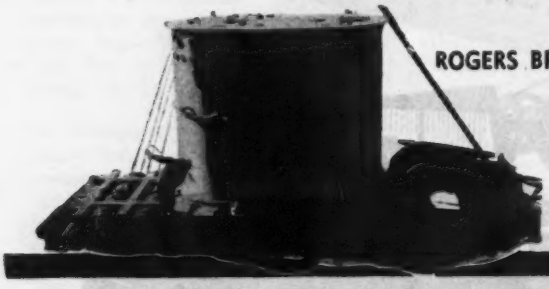

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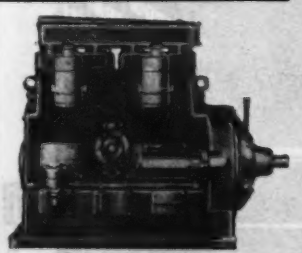
MEN AND JOBS

L. K. White, assistant city engineer of Wichita, Kan., since 1928, has been promoted to city engineer to lessen the administrative load on P. L. Brockway who has been city engineer for the past 27 years. Mr. Brockway will continue to serve as director of public service. A native of Kansas, Mr. White was graduated from Baker University, Baldwin, Kan. in 1915. Prior to being employed by Wichita, he spent several years in federal aid bridge and highway construction in Sedgewick County, Kan.

Louis R. Douglass has been appointed assistant to E. A. Moritz, director of Region 3 of the Bureau of Reclamation, Boulder City, Nev. He joined the bureau in 1933 as associate engineer in the dam designing section. In 1944 he was appointed engineering assistant to the Commissioner at Washington, D. C. He was later detailed to the Denver office as engineer, administrative adviser in the branch of Design and Construction. He earned his civil engineering degrees at the University of Colorado. From 1917 to 1919 he served in the Construction Division of the U. S. Army, with rank of captain. He has had many years experience in the engineering field, having served as assistant chief of construction for a sub-



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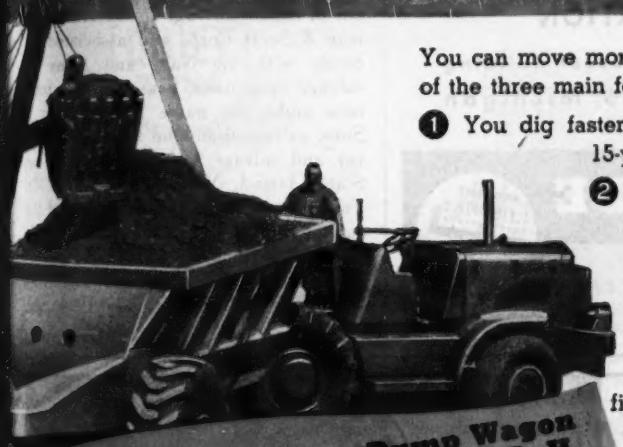

Heil Hi-Speed Bottom Dump Wagon carries 12 yard load at 27 M. P. H.

This job-tested unit saves loading time, cuts hauling time, and speeds dumping. You can turn short and fast — and features such as high clearance, self-cleaning doors, lots of power, big tires, and scientific weight distribution for maximum traction mean greatly reduced "weather" delay. The Hi-Speed Tractor can be used interchangeably with the Hi-Speed Cable Scoop to give you alternate pieces of equipment to speed dirt-moving jobs.

You can move more yardage faster and at less cost by taking advantage of the three main features of famous Heil Hi-Speed Cable Scrapers:

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Ask your Heil distributor for the complete story of why Heil Hi-Speed Cable Scoops give you fast, profitable dirtmoving at low cost per yard.

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sidiary of the Ford Motor Co., for the city of Denver, Colo. and for the National Park Service.

L. Harold Anderson, city engineer and director of public utilities of Palo Alto, Calif., recently was appointed by Gov. Earl Warren to serve on the State Railroad Commission, succeeding Franck R. Havenner, elected to Congress in November.

Mr. Anderson, who received his civil engineering degree from Stanford University in 1924, became director of Palo Alto utilities in 1933, and in 1941 assumed the added duties of city engineer and superintendent of streets. Mr. Anderson has served as president of the California Municipal Utility Association for ten years and was president of the Pacific Coast Building Officials' Conference.

Geoffrey G. Ommanney, harbor engineer and recently development commissioner of the Canadian Pacific R.R., has retired and is succeeded by **Gordon M. Hutt** of Winnipeg, Man., who is replaced by **W. G. Cowie,** engineer, of Montreal.

J. I. Tooker, formerly superintendent of marine salvage for Merritt-Chapman & Scott Corp. and associated recently with the Navy and Army on salvage operations, has gone into business under the name J. I. Tooker & Sons, as consultants on underwater survey and salvage with headquarters on Staten Island, New York, N. Y. Mr. Tooker was in charge of salvage of the sunken Normandy and most recently supervised removal of a sunken ship from a pier in Portland for the Army Engineers (*ENR* Dec. 14, 1944, vol. p. 771).

The Rud-o-Matic Combination Magnet Reel and Tagline is a radical departure from the usual reel, something which is brand new and which no one else can offer. It is operated on a string principle for tension. Tagline cable is attached to magnet with sufficient tension to steady, then electric cable is loosened to connections on magnet, leaving same a little slack. As both drums revolve together, electric cable always maintains the degree of slackness originally set. This feature eliminates any possibility of electric cable being pulled apart or jerked loose from the connections, thus insuring a long life for it. Most of the crane manufacturers have adopted Rud-o-Matics as standard equipment.

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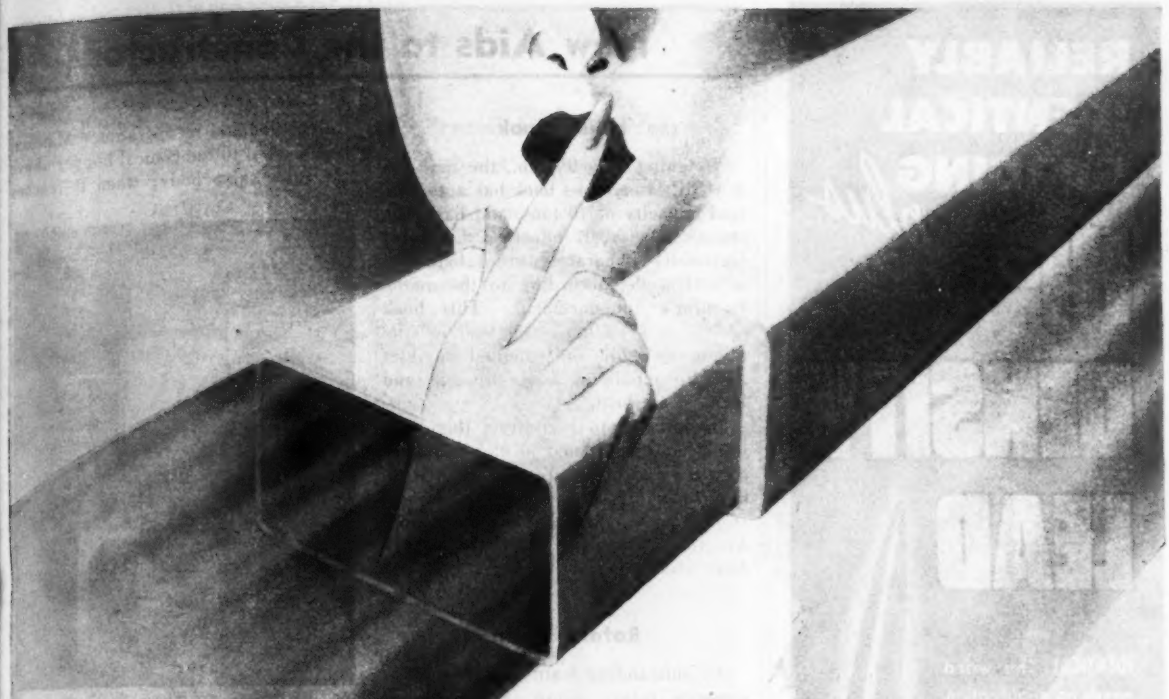
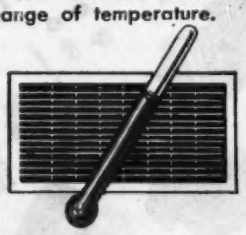


New way of *sh-h-hushing* FAST AIR!

CAREYDUCT "soaks up" sound . . . hushes air noise . . . won't "telephone" fan or other noises . . . is 40% to 50% *quieter than ordinary duct.*

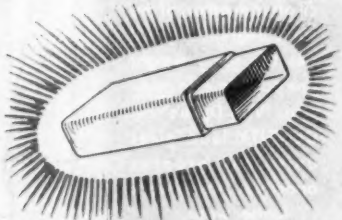
EASY, LOW-COST INSTALLATION. Careyduct eliminates six labor operations. Uses simple, factory or job-built fittings. No special tools. Adapts to standard grilles and dampers.

HIGH THERMAL EFFICIENCY! Careyduct delivers either hot or cold air with a minimum change of temperature.

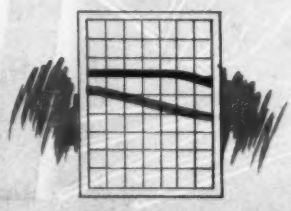


Carey duct —an insulated duct made of asbestos—can be used in smaller sizes because it handles higher velocities quietly and efficiently. Careyduct—being 40% to 50% quieter—can handle 2500 cubic feet a minute easily and quietly compared with a maximum of 1400 cubic feet a minute for ordinary duct.

Careyduct is proving itself today on many large industrial and governmental installations. Write for engineering data on capacities, characteristics and specifications.



CAREYDUCT itself is trim, smooth, good looking. Or it can be painted or decorated to harmonize with any interior.



LESS FRICTION-LOSS BY TEST. Careyduct's smooth surface and flush joints eliminate leakage, "breathing" or vibration. It's fireproof.

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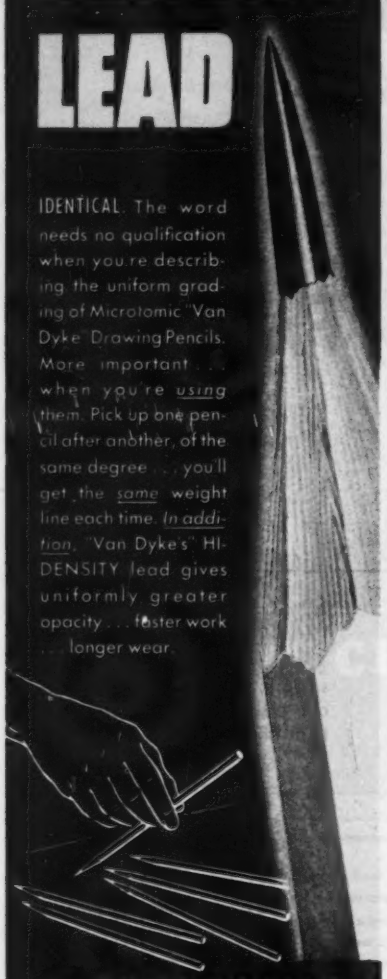
IDENTICAL. The word needs no qualification when you're describing the uniform grading of Microtomic "Van Dyke" Drawing Pencils. More important . . . when you're *using* them. Pick up one pencil after another, of the same degree . . . you'll get the *same* weight line each time. *In addition*, "Van Dyke's" HI-DENSITY lead gives uniformly greater opacity . . . faster work . . . longer wear.



MICROTOMIC VAN DYKE DRAWING PENCILS

The EBERHARD FABER Drawing Pencil in 18 degrees, 7B to 9H plus 6 degrees with special Chisel Point Leads

New Aids to the Constructor

Hoist Hook

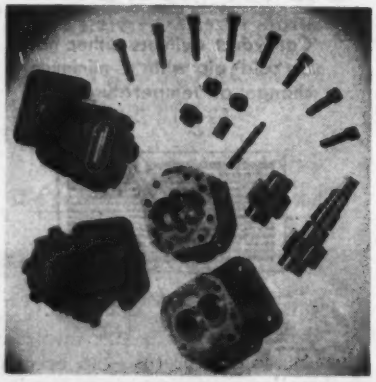
Weighing only 9½ lb., the new No. 2 ACLC safety hoist hook has a guaranteed capacity of 10 tons, and has withstood, without ill effect, a Columbia University Laboratory proof load test of 60,000 lb., according to the manufacturer's announcement. This hook is said to keep hoist and load in true alignment, while the patented shoulder and lip eliminate load slippage and hook straightening.

In addition to its safety, this hook is efficiently designed to clear hatches, cornices and other protuberances without snagging.—*Invented by Robert Hoßman; manufactured and distributed by American Chain Ladder Co., 151 East 50th St., New York, N. Y.*

• • •

Rotary Pump

An outstanding feature of a new low pressure rotary pump is the Barnes patented spur gear tooth form, which is said to eliminate excessive sliding and to reduce fluid slippage to a minimum through perfect sealing action. Pump



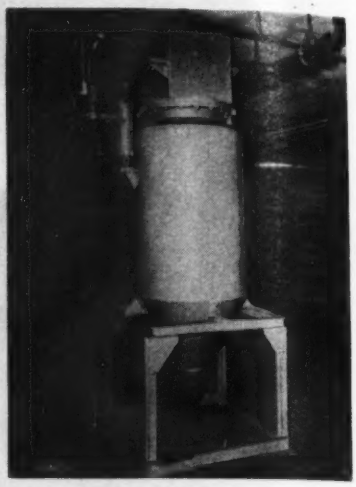
capacities range from 1 gpm. at 600 rpm. to 4 gal. at 2,400 rpm. The pump has high volumetric efficiency in pumping fluids of extremely low viscosity.

A relief valve protects against excessive pressures. The maximum pressure range on this self-priming and self-lubricating pump is 200 lb. per sq. in., and tests show that vacuum to 26-in. mercury gage is feasible. The pump weighs only 3½ lb. complete, and can handle practically any fluid with lubricating qualities.—*John S. Barnes Corp., Rockford, Ill.*

• • •

Pneumatic Ejector

Designed for conveying heavy materials in bulk transport systems, the "Transporter" pneumatic ejector is fully automatic in operation. Material is delivered to the conical hopper above the inlet valve body; when it reaches



a predetermined level, the loading device stops, an inlet flap valve is closed, and compressed air admitted, blowing clear the discharge line.

"Transporter" units range in size from 10 to over 200-cu. ft. displacement. The ejector has no moving parts nor motor and is silent in operation.—*Yeomans Brothers Co., 1433 North Dayton St., Chicago 22, Ill.*

• • •

Cement Floor Treatment

Cement floors are said to be harder and more resistant to water, grease and chemical infiltration when treated with Synkrete Concentrate. This product, diluted by three parts of water, may be applied by mop, brush, broom or sprinkler; it sinks deep into the pores of dusting concrete, where it hardens into a rocklike substance that reinforces the binder and prevents surface particles from being worn away.

Synkrete is almost colorless and does not affect the floor's appearance. A treatment with this liquid before painting acts as sizing, and it is claimed that paint will last longer without peeling or blistering.—*Synthex Products Co., 2 West 45th St., New York 19, N. Y.*

• • •

Wood Preserver

To control or eliminate dry rot, fungi and molds in wood in contact with moist ground or in damp areas, Triple-A Copper Naphthenate wood preserver will penetrate and impregnate the wood, it is claimed. Brushed on, sprayed or dipped, this product provides permanent

treatment at low cost. It is non-poisonous to humans, and will not bleed through when light colored paints are applied.

This preservative, green in color, is available in 1, 5, 30 and 55-gal. containers; one gallon will treat approximately 200 sq.ft. of surface.—*Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.*

• • •

Switch Breaker

Said to be remarkably temperature-resistant, a new bi-metal Littelfuse switch breaker No. 1560 (AN3160) takes 330 deg. F. and 60 deg. F. below zero ambient temperatures without breaking. Of switch type, this device has a range of 5 to 50 amperes at 32 volts, AC or DC. It is capable of breaking 2,500 amperes on short circuit, and can hold for one hour at 115 percent of rated current.

This breaker, enclosed in a moisture-proof black bakelite case, is panel mounted. Its overall size is 2⅛x2 in. deep below panel x¾ in. wide.—*Littelfuse, Inc., 200 Ong St., El Monte, Calif. and 4757 Ravenswood Ave., Chicago 40, Ill.*

• • •

Automatic Bench Vise

Clamping pressures from zero up to 2½ tons are provided by a new powerful air or hand-operated bench vise, the manufacturer states. This device, called Vispeed, consists of a standard 4-in. Reed bench vise operated by an 8-in. foot-controlled air cylinder. It operates through the full range of the 6-in. jaw opening; the positive safety control limits the movement of the jaws from zero to a maximum of 1 in. Toe pressure closes the jaws, heel pressure opens them, and they lock in either position.

Vispeed is available as a complete packaged unit, or the air unit may be purchased separately.—*The Bellows Co., Akron, Ohio.*

• • •

Cargo Crane

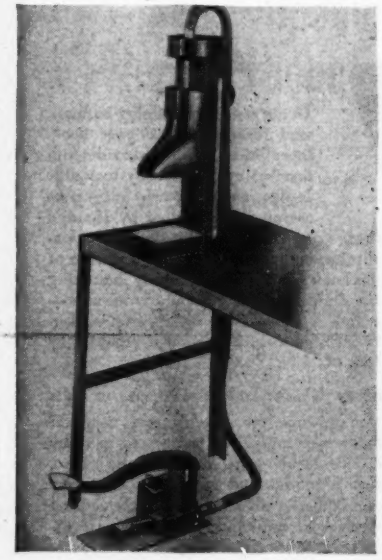
Swift loading, unloading and stacking are said to be possible with the recently announced Model YC-9 cargo crane. This 10-ton capacity machine has a 10 ft. 9¼ in. wheelbase and is wheel-mounted on solid or pneumatic rubber tires, with all controls and steering hydraulically operated. The upper machinery is mounted on a 44-in. cast steel turntable. The telescopic boom extends from 14 to 20 ft.

The entire unit operates by a three-speed transmission from a 40 hp. gas engine, for traveling, swinging, hoisting and boom hoist. There are three traveling speeds forward and one reverse, with a low speed of 1.9 mph., and a high of 6.75 mph.—*Link-Belt Speeder Corp., 307 North Michigan Ave., Chicago, Ill.*

• • •

Precision Punch Press

Of semi-steel construction, a new precision bench press can be used as a pipe vise, tensile or compression testing machine, or a shear for plate or rounds. This 5-ton machine, with a 5x6-in. platen and 7 in. of ram movement, incorporates "V" ways to eliminate use of die shoes. Two levers are used in the hydraulic foot control.



The new press is portable when mounted on a portable stand, and with proper equipment may be used as a tensile and compression testing unit up to 5 tons, as a pipe vise to handle up to 6-in. pipe, or as a shear for ¼ in. plate or ½ in. rounds. The unit can also be used for marking, notching, riveting, crimping, mounting samples, etc.—*Reimuller Brothers Co., 9400 Belmont Ave., Franklin Park, Ill.*

• • •

Pipe Repair Band

Leaks in pipes, hose or tanks from ½ in. to 30 ft. in diameter may be repaired with Band-It bands, the manufacturer asserts. This band, of high quality steel, has a tensile strength of over 2,300 lb. in the ¾-in. width. It is packed in 100-ft. rolls; the carton is the dispenser, and the Band-It buckles are made in the same sizes as the band.

A 4½-lb. tool used with the band makes possible quick and economical repair of any leak, without disconnecting or shutting off any equipment, it is claimed.—*The Band-It Co., Denver 5, Colo.*

Black on White for Better Sight

WYTEFACE "A" Steel Tapes have *raised* black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Faster measurements with fewer errors. Designed for hard service. White background is protected by raised steel markings and rims. Resists abrasion from rails, pipe, rocks, concrete. Protected against rust. See your dealer. Write for catalog.

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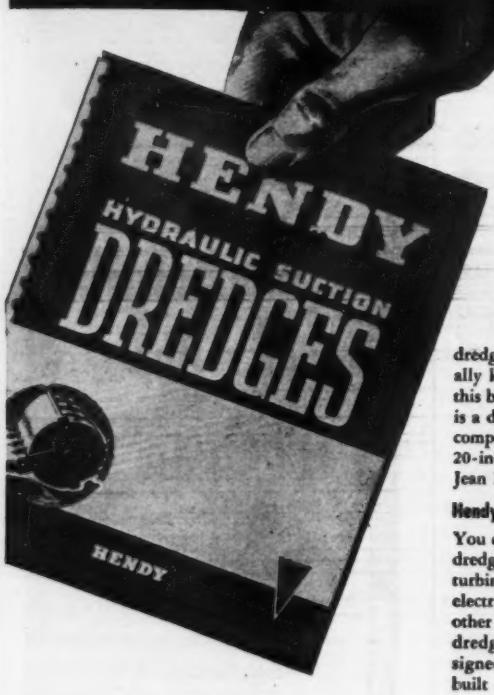

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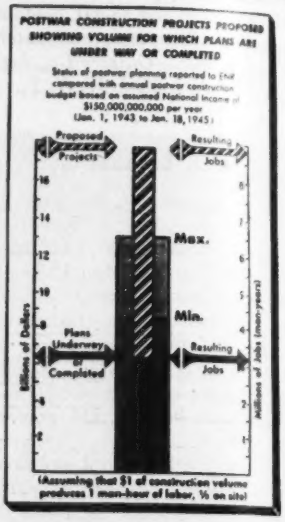
POSTWAR PROJECTS


POSTWAR CONSTRUCTION PROJECTS PROPOSED SHOWING VOLUME FOR WHICH PLANS ARE UNDER WAY OR COMPLETED
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year (Jan. 1, 1943 to Jan. 18, 1945)
Proposed Projects
Resulting Jobs
Max.
Min.
Plans Underway or Completed
Resulting Jobs
Billions of Dollars
Millions of Jobs (man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume, and in jobs or man-years of labor how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

★**Md., Baltimore**—City, plans imprv., exten. water supply sys. **$12,500,000** bonds voted. CD 1/26/44—ENR 2/10/44.

N. H., Rochester—City, plans water extens. and sewage disposal plant. **$363,349.**

PLANS UNDER WAY

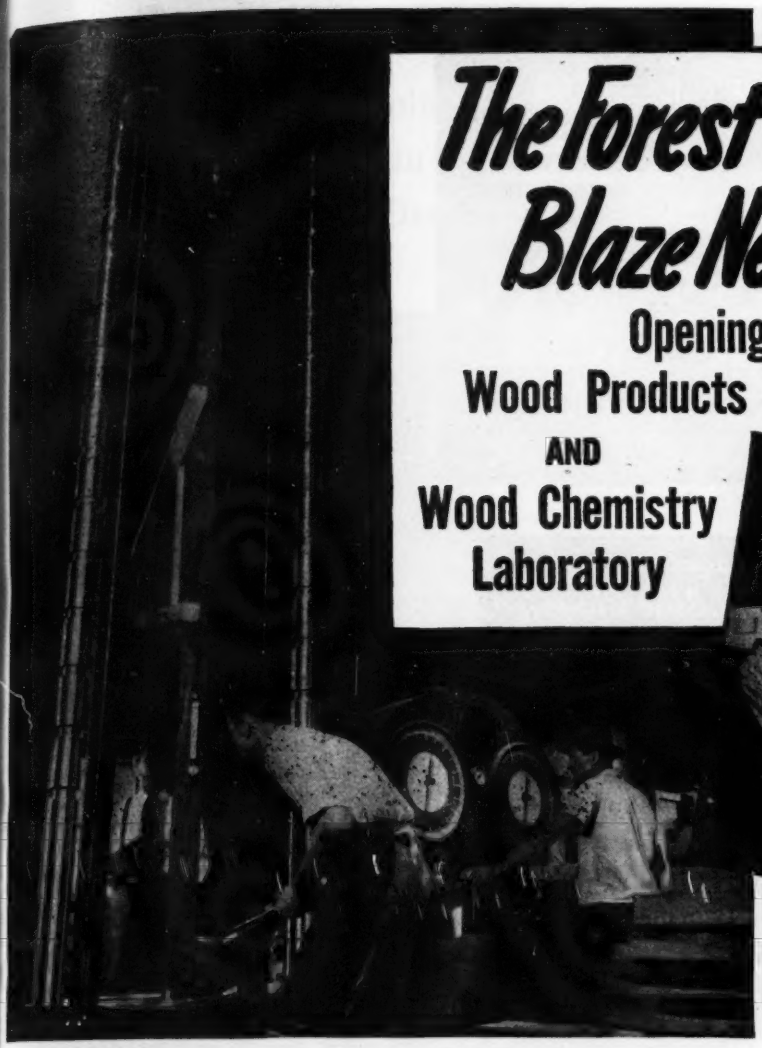
★**Calif., Burbank**—City, City Hall, 275 E. Olive St., exten. water distr. sys. **$1,663,000.** Funds available. H. R. Bennett, City Hall, city engr.

★**Calif., Burbank**—City, City Hall, 275 E. Olive St., plans water treatment plant. **$680,000.** Financing not completely available. H. R. Bennett, City Hall, city engr.

★**Calif., Los Angeles**—Dpt. Water & Power, 207 S. Bway., Los Angeles, plans San Pedro Reservoir, **$300,000**; Venice Reservoir, **$390,000**; storm water protection at San Fernando Reservoir, **$600,000**; storm water protection and by-pass at Dry Canyon Reservoir, **$671,000**; imprv. Chatsworth Reservoir, **$2,874,000**; preliminary plans 58,000 lin. ft. 63 in. water line from Chatsworth Reservoir, **$1,693,000**; connecting water line between Stone Canyon and Franklin Reservoirs, **$285,000**; plans 20% completed reconstructing Stone Canyon Reservoir, **$1,806,000**; plans under way Los Angeles Aqueduct, reinforcing 15 mi. ribbed cover, Haiwee Reservoir to Fairmount Reservoir, reinforcing Soda Hills tunnel lining, 2 desilting structures, overhead spillways, new needle valves in siphons, **$671,000**; plans 50% completed Upper Stone Canyon Dam and Reservoir, **$270,000**; 7,830 lin. ft. 60 and 51 in. watermain, incl. outlet tunnel, **$423,000**; plans 75% completed Baldwin Hills Reservoir, **$4,208,000**; plans 10% completed adjusting water supply sys., **$2,000,000**; preliminary plans 25% completed replacing 20,400 lin. ft. 48 in. main in 3 St. Main, from Formosa

The Forest Industries Blaze New Trails

Opening of TECO Wood Products Development Shop AND Wood Chemistry Laboratory



TECO Chemistry Laboratory. TECO chemists are here shown working on lignin derivatives.

200,000 lb. Baldwin-Southwark testing machine in the TECO Shop. Material undergoing test is a small wood column being tested in compression.

Timber Engineering Company announces the opening of its Wood Products Development Shop and Wood Chemistry Laboratory located in Washington, D. C.

The Wood Products Development Shop has a full scale testing rig equipped to handle trusses up to 50' span; auto-claves and other equipment used in pressure treating; dry kiln and high pressure steam equipment for impregnating; and other facilities for determining the physical and mechanical properties of wood and wood products.

The Wood Chemical Laboratory has modern equipment for investigations in wood chemistry and wood derivatives research. It is giving special attention to lignin research including adhesives, synthetic plastics, etc.

If you have any problems in respect to the physical, mechanical and chemical properties of wood, the technical staff of the Timber Engineering Company may be of assistance on a moderate fee basis. If its own facilities will not solve your problem, it will assist you in locating sources which can.

Consultations at our Washington office may be made by appointment and without obligation on your part. Write us on your business letterhead stating your wood utilization problem.

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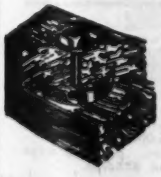

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An Illinois operator has this to say regarding their Eagle 18" Screw Type Gravel Washer. "This machine is giving extremely satisfactory service. We wash about 200 yds. of gravel per day and are very effectively removing chunks of blue clay and waterlogged wood with it. *While we are feeding this washer with gravel which is much too small, yet it is doing an excellent job of cleaning.*"

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Send for Catalog No. 44 for complete details on Eagle Classifying and Dewatering Equipment.

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Eagle Portable Stock Pile Rewashers are a definite aid to premium sand and gravel producers who desire a final washing of sized stock pile materials prior to shipping. Supplied complete with bin, screw washer, tank and loading chutes, they produce a large volume of high quality material. Details of existing plants or special designs to suit your specifications gladly supplied on application.

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POSTWAR PROJECTS (Cont'd.)

Ave. to Benton Way, $533,000; Hollywood Reservoir outlet line, $982,000; Colorado Water Supply to Silver Lake and Hollywood Reservoir, $2,280,000; preliminary plans 50% completed Silver Lake Reservoir outlet, $991,000; 22 wells and 15,000 lin. ft. connecting pipelines in San Fernando Valley, sump and booster pump to Hollywood Reservoir, $496,000; 40,000 lin. ft. 42 and 54 in. main exten. River Supply Conduit, $911,000; preliminary plans under way connecting waterline between Hollywood Reservoir inlet line, $136,500; cementing and reconstructing 46,000 lin. ft. 62- to 72-in. steel pipe, $292,000. S. B. Morris, 207 S. Bway., engr.

Ind., Salem—City plans WW plant. $50,000. M. Mann, city engr.

★ **Mass., Chicopee**—Water Dpt., F. Driscoll, supt. plans under way steel elevated tank, small dam, c.i. distr. sys. $492,100. Land rights not cleared, financing not available. Hayden & Harding, Park Sq. Bldg., Boston, consult. engrs. T. F. Robinson, city engr.

Mass., Everett—City, B. W. Vaughn, supt. City Hall, Everett, Zone 49, exten. water pipelines. $50,000. Financing not available. J. W. Holmes, City Hall, Everett, Zone 4, city engr.

Mass., Lexington — Town, Town Offices, Lexington, Zone 73, plans 60% completed strengthening water distr. sys. $300,000. G. E. Russell, 6 Audubon Rd., consult. engr. and J. T. Cosgrove, Town Offices, town engr., both Lexington, Zone 73.

★ **Mass., Lynn**—City, T. W. Heath, water Comr., City Hall, preliminary plans completed 1 m. g. storage reservoir, Great Woods Rd. $1,000,000. F. E. Gowdy, City Hall, engr. CD 11/7—ENR 11/25.

Mo., Columbia—City, plans 30% completed water tower, boiler for water plant. $430,000. Financing provided. Burns & McDonald Eng. Co., 107 W. Linwood Blvd., Kansas City, Mo., consult. engrs. D. E. Crane, water supt. CD 8/16—ENR 9/7.

N. D., Minot—City, plans addnl. well and connections. $35,000. L. G. Wilhelm, city engr.

S. D. Faulkton—City, Florence Greener, aud., WW sys. $20,000. J. Steven, Rapid City, consult. engr.

Tex., Dallas—City, plans 90% completed 16 in. c.i. mains from Greenville Ave. Sta. to Lakewood tanks, brick, pump station, $145,000; 2 m.g. elevated steel storage tank, $110,000, Financing available, Koch & Fowler, Gr. Natl. Bldg., Myers & Noyes, Tower Pet. Bldg., and Rollins & Forest, Praetorian Bldg., consult. engrs. CD 10/21/43—ENR 10/28/43.

READY FOR BIDS

★ **Fla., Jacksonville**—City, plans completed elevated water tanks $2,112,000; master pump. station, $1,150,000; rebuilding, expanding Main Street pumping and control plant, $1,078,000; enlarging, imprv. McDuff Ave. Reservoir and distributing station, $892,000; South Jacksonville distribution plant, $750,000; Fairfax Reservoir and control station, $729,000; constructing addnl. water distr., $500,000; constructing operating control field for water sys., $500,000; distributing center in River Oaks Suburb., $431,000; imprv. Hendrick Ave. supply station, $10,000. Financing provided. W. E. Shedden, Engineers Bldg., ch. engr.

★ **Miss., Jackson**—City, plans completed river intake and pump. station, 24 in. discharge line to water plant, $114,000; distribution sys. exten., 24 in. feeder main from plant to city and 1 m. g. elevated steel tank, $500,000. Financing provided. Black & Veatch, 4706 Bway., Kansas City, consult. engrs. B. F. Wade, supt. waterworks.

★ **Tex., Dallas**—City, plans completed increasing 25 m.g. water supply at Bachman Filtration plant, incl. 8 new filter units, $750,000, Koch & Fowler, Great Natl. Life Bldg., Myers & Noyes, Tower Petroleum Bldg. and Rollins & Forrest, Praetorian Bldg., all Dallas, consult. engrs.; exten. water supply, $255,000. Financing available. CD 4/30/43 and 10/25/43—ENR 5/6/43—10/28/43.

Ore., Medford—City, City Hall, plans completed 10 m.g. reservoir $250,000. Financing provided. Cunningham & Assoc., Spalding Bldg., Portland, consult. engrs. D. T. McDonough, City Hall, city engr.

CONTRACTS AWARDED

N. H., Concord—Concord Water Works, plans completed 6- to 24-in. watermains, garage addn. $97,542. Will build with own forces. Financing provided. P. R. Sanders, Green St., supt.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

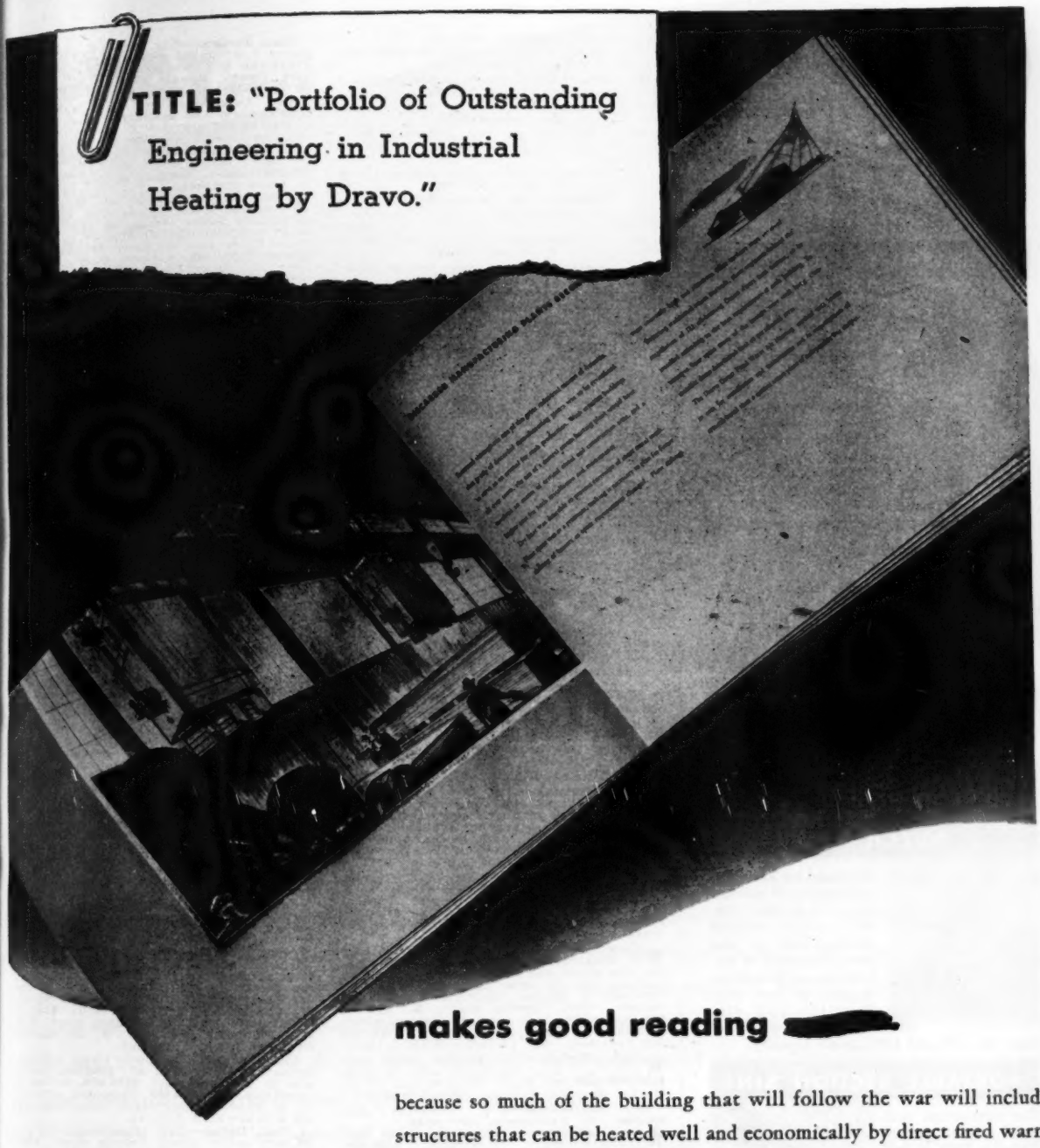
★ **Mass., Brookline** — Town, Town Hall, plans trunk sewer, Akron pipe and concrete, sanitary main sewer, surface water drain. $700,000. CD 1/10/44—ENR 1/27/44.

Pa., Athens—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Berwick—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Bloomsburg — Boro, plans sewage treatment plant. To exceed $25,000.

TITLE: "Portfolio of Outstanding Engineering in Industrial Heating by Dravo."



makes good reading

because so much of the building that will follow the war will include structures that can be heated well and economically by direct fired warm air heat. Auditoriums, schools, churches, supermarkets, automobile showrooms—these and many other buildings with large undivided area are well suited to this method of heating which gives high overall efficiency with any available fuel; gas, oil, anthracite, bituminous or lignite coal. This Portfolio shows some interesting wartime jobs done by Dravo Direct Fired Heating, and indicates the future possibilities of a method so flexible and economical. We'll mail a copy at your request.

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POSTWAR PROJECTS (Cont'd.)

Pa., Canton—City, plans sewage treatment plant. To exceed $25,000.

Pa., Catawissa—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Danville—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Forty Fort (br. Wilkes-Barre)—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Hallstead—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Kingston (br. Wilkes-Barre)—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Millville—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Nanticoke—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Nescopeck—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Northumberland—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Pittston — Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Pittston — Pittston Township, plans sewage treatment plant. To exceed $25,000.

Pa., Plains (br. Wilkes-Barre)—Township Secy., plans sewage treatment plant. $25,000.

Pa., Plymouth—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Sayre—City, plans sewage treatment plant. $25,000.

Pa., Susquehanna—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Towanda—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Troy—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Tunkhannock—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., West Pittston (br. Pittston)—Boro, plans sewage treatment plant. To exceed $25,000.

Pa., Wilkes-Barre—City Council, plans sewage treatment plant. To exceed $25,000.

Pa., Wyoming (br. Pittston)—Boro plans sewage treatment plant. To exceed $25,000.

R. I., Warwick—City, E. L. Godfrey, solicitor, plans incinerator, at City Yard. $50,000.

★**Tex., Laredo**—City, c/o H. S. Cluck, mayor, plans sanitary sewers $75,000, 17 mi. storm sewers $500,000, disposal plant $50,000; incinerator addn. $25,000.

PLANS UNDER WAY

Calif., Burbank—City, City Hall, 275 E. Olive Ave., plans 30% completed vitr. clay sanitary sewers, manholes and c.i. rings and covers, $200,000. Financing available; rein.-con. storm sewers, catch basins, appurtenances, $240,000. Financing not provided. H. R. Bennett, City Hall, city engr.

Conn., Glastonbury—Town, B. F. Turner, chn., 2327 Main St., preliminary surveys completed disposal sys., mains and disposal plant, north and central sects. $250,000. Financing not provided. Keis & Holyrod, 257 Bway., Troy, consult. engrs.

★**Conn., New Haven**—City, J. Golden, dir. P. Wks., 505 Hall of Records, plans under way storm and sanitary sewers, 4 pump. stations, 12- to 48-in. c.i. pipe, $2,526,150, Westcott & Mapes, Inc., 139 Orange St., consult. engrs. (survey only), N. Ayman, 200 Orange St., engr.; sewage disposal plant, $677,835, V. Barry, city engr. Financing not provided. CD 12/23/43—ENR 1/13/44.

★**Ind., Marion**—City, surveys under way sewerage sys., for south side of city. $250,000-$600,000. H. B. Steeg & Co., 129 E. Market St., Indianapolis, consult. engrs.

Ia., Kimballton—City, sewerage sys. $30,000. H. Rasmussen, city engr.

★**La., Lafayette**—City, plans under way sanitary sewer, incinerator. $556,000. J. B. McCrary Co., 22 Marietta St., Atlanta, Ga., consult. engr. CD 1/7/44—ENR 1/27/44.

★**Me., Waterville**—City, plans sewerage sys. and treatment plant. $500,000. H. E. Green, city engr.

★**Md., Baltimore**—City, plans under way exten. sewerage exten. $3,000,000 bonds voted. CD 1/27/44—ENR 2/10/44.

★**Mass., Chicopee**—City, plans under way sanitary or combined intercepting sewers, sewage disposal plant. $1,438,886. Land rights not cleared, financing not available. Tighe & Bond, 159 High St., Holyoke, consult. engrs. T. F. Robinson, City Hall, city engr.

Mass., Everett—City, City Hall, Everett, Zone 49, plans sewer and surface drainage, cleaning and repairing sewers. $106,000. Financing not available. J. W. Holmes, City Hall, Everett, Zone 49, city engr.

Mass., Lexington—Town, Town Offices, Lexington, Zone 73, plans 35% completed gravity sys. sanitary sewers, incl. 22,000 ft. 8- to 12-in. pipe. $125,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, consult. engrs. J. T. Cosgrove, town engr.

★**Mass., Lynn**—City, plans completed sanitary sewers. $500,000. Financing not provided. F. E. Gowdy, city engr. CD 2/10—ENR 2/24.

Miss., Jackson—City, City Hall, plans completed 2 mi. relief sanitary sewer. $118,000. Financing not provided. Black & Veatch, 4706 Bway., Kansas City, consult. engrs. J. J. Halbert, city engr.

Mo., Columbia—City, plans 40% completed storm and sanitary sewers. $400,000. Financing not provided. D. Welch, Columbia, city engr. CD 8/16—ENR 9/7.

★**Mo., Independence**—City, plans 75% completed imprv. storm sewerage sys., $1,000,000; imprv. sanitary sewers, $75,000. H. A. Jones, city engr.

★**Mo., St. Joseph**—Bd. P. Wks., A. J. Branum, pres., plans 75% completed Whitehead Sewer extens., 30 and Monterey to 28 and Commercial Sts., 22 to 29 Sts., Sewer extens. from Corby Pond to Lovers Lane and from Frederick Ave. to Lovers Lane, $548,800; Blacksnake Sewer extens., from Karnes Rd. to city limits, $204,900.

Mont., Glasgow—City, City Hall, plans storm sewerage sys., imprv. storm sewers. Over $25,000. Corwin & Co., Medical Arts Bldg., Great Falls, consult. engrs.

★**Mont., Great Falls**—City, plans 70% completed storm sewers for entire city. $1,800,000. Financing not provided. E. Henen, Civic Center, city engr. CD 7/15/43—ENR 7/22/43.

N. H., Concord—City, plans 90% completed storm sewers. $146,110. Financing not provided. E. E. Beane, city engr. CD 3/27—ENR 4/6.

N. D., Minot—City, plans storm sewer extens. $50,000. L. G. Wilhelm, city engr.

S. D., Custer—City, J. F. Broyles, aud., imprv. sewage disposal plant. $25,000. J. Steven, Rapid City, consult. engr.

S. D., Hurley—City, sewage disposal sys. and plant. $30,000. Dakota Engineering Co., Mitchell, consult. engr.

S. D., Ipswich—City, sewage disposal plant. $25,000. Perkins & McWayne, Paulton Blk., Sioux Falls, consult. engrs.

Tex., Dallas—City, plans 50% completed 36 in. trunk sanitary sewer in Oak Cliff to Beckley Ave. $350,000. Financing available. Myers & Noyes, Tower Pet. Bldg., Rollins & Forrest, Praetorian Bldg. and Koch & Fowler Gr. Natl. Life Bldg., consult. engrs.

Tex., Lockhart—City, S. H. Tabor, mayor, plans completed sewerage sys., collector sys. and pump. station. $100,000. Financing not provided. J. Montgomery, Littlefield Bldg., Austin, Zone 15, consult. engr. CD 4/17—ENR 5/4.

Tex., San Marcos—City, E. C. McGee, mayor, plans completed sewage disposal plant, exten. collector sys., pump. station. $150,000. Financing not provided. J. Montgomery, Littlefield Bldg., Austin, Zone 15, consult. engr.

Wash., Davenport—City, plans sewage disposal sys. To exceed $25,000. W. L. Maloney, Symons Bldg., Spokane, consult. engr.

Wash., Vancouver—City, plans under way 15,600 ft. interceptor sewer. $210,000. M. Ray, city engr.

READY FOR BIDS

Calif., Burbank—City, City Hall, 275 E. Olive St., plans completed exten. sanitary sewers. $200,000. Funds available. H. R. Bennett, City Hall, city engr.

★**Fla., Jacksonville**—City, plans completed lateral sanitary sewer connections from 44 Street outfall, $450,000; from Jackson Street outfall, $254,000; sanitary sewers, $250,000; outfall sanitary sewer Jackson St., $250,000; outfall sewer 44 St., $450,000; constructing and laying ditch liners, $100,000. Financing provided. W. E. Shedden, Engineer Bldg., city engr.

Fla., Jacksonville—City, plans completed incinerator, Cleveland St., $100,000, incinerator in Riverside Sect. $100,000, fencing incinerators, etc. $28,500. Financing available. W. E. Shedden, Engineers Bldg., city engr. CD 2/4/43—ENR 2/11/43.

★**Tex., Dallas**—City, plans completed sanitary sewer along Trinity River, Turtle Creek to Record Crossing, $700,000, 55 sanitary sewer extens. $186,000, 16 in. trunk line sewer from Knights Branch to Cedar Springs, $35,000, relief sewer in Skillman Ave. $30,000, Myers & Noyes, Tower Pet. Bldg., Rollins & Forrest, Praetorian Bldg., and Koch & Fowler, Gr. Natl. Life Bldg., consult. engrs., sanitary sewer mains $601,000. All funds available. CD 1/10/44—ENR 1/27/44.

BRIDGES

PROPOSED WORK

Tex., Laredo—City, H. S. Cluck, mayor, plans bridge on Washington-Corpus Christi Rd., $75,000., bridge on Sanches St., $65,000.

★**Mo., St. Joseph**—Bd. Ed. Wks., A. J. Branum, pres., plans trafficway across city from Belt Hy. and Messanie St. to Missouri River bridge, with viaducts at 28 and Messanie Sts., 9 and Pacific Sts. over railroad tracks from 8 and Pacific Sts. to 6 St., $1,403,125; viaduct over MacArthur Dr., foot of Chestnut St., $225,000; viaduct over 4 St., separating C.G.W.Ry. crossing, $182,063; viaduct over Paris Ave. at Rosine St., $14,825; railroad crossings 6 and Seneca Sts., $197,375.

POSTWAR PROJECTS (Cont'd.)
PLANS UNDER WAY

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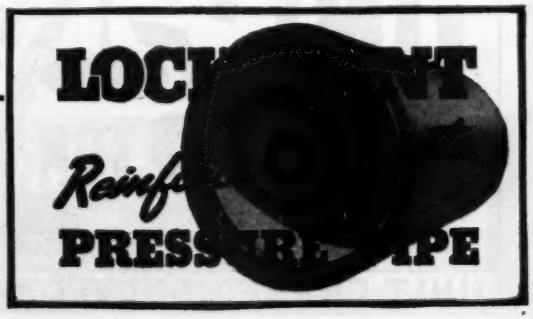

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POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

California—State Div. Hys., Pub. Wks. Bldg., Sacramento, plans completed for approach to Aliso Viaduct, Aliso and Pleasant Ave., Los Angeles. $132,140.

Calif., Los Angeles—City, plans 120 ft. Vignes St. Grade Separation under Aliso St., $167,500; plans under way 200 ft. Anaheim St. Grade Separation, Vermont Ave. to Gaffey St., $59,800; 570 ft. Mission Rd. Grade Separation, under 1st St. and Los Angeles Ry. $109,000. L. Aldrich, City Hall, city engr.

Calif., Los Angeles—State Div. Hys., Pub. Wks. Bldg., Sacramento, plans completed Moorpark Bridge over Middle Tujunga Channel. $88,737.

La., Lafayette—City, plans under way underpass. $75,000. J. B. McCrary Co., 22 Marietta St., Atlanta, Ga., consult. engr. CD 1/7/44—ENR 1/27/44.

Ill., Winchester—Scott Co. Hy. Dpt., M. J. Benscoter, supt., plans under way bridge. $100,000. Financing not provided.

★**Minn., Hastings** — State Hy. Dpt., St. Paul, plans under way, 499 ft. steel, concrete bridge, with 2 anchor spans of 192 ft. over Mississippi River. $500,000. E. J. Miller, St. Paul, bridge engr.

Missouri—State Hy. Comn., Jefferson City, plans 90% completed two 15 ft. rein.-con. slab span bridge over west fork of Hamilton Branch and two 13 ft. span bridge over Hamilton Branch, on Stanto-St. Clair Rd., Rt. 66, Proj. FA 258C1, Franklin Co. $31,000. Land rights not cleared; four 29 ft. I-beam span bridge over Flat Creek, Rt. 8C, Project FAS 14 G1, Pettis Co., $8,500. Land rights not cleared, and financing not provided. C. W. Brown, Jefferson City, ch. engr.

★**Tex., Beaumont**—City plans 25% completed 4-lane bridge over Neches River. $1,500,000.

READY FOR BIDS

★**Fla., Jacksonville**—City plans completed viaduct over railroad tracks, Davis St., $750,000; viaduct over railroad crossing on Main St., $750,000; miscellaneous bridges, $30,000. Financing available. W. E. Shedden, Engineers Bldg., city engr.

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Of $17,000,000,000 of proposed postwar construction at beginning of 1945 only $500,000,000 was reported ready for bids", with plans complete, and financing available.

please send them in to be added to the total above to give a measure of the materials that will be needed to relax restrictions and go ahead with civilian work.

Send ready-for-bids projects news to Elsie Eaves, Manager Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y.

STREETS AND ROADS

PROPOSED WORK

★**Mass., Brookline**—Town, Town Hall, plans widening, reconstructing, constructing streets. $10,000,000. Land rights not cleared, financing not provided.

Tex., Laredo—City, H. S. Cluck, mayor, plans street paving. $50,000.

★**Washington**—State Hy. Dpt., Olympia, plans relocating 14 mi. Stevens Pass Hy. between Monroe and Gold Bar, $900,000; widening, surfacing Bway. Cutoff, Everett, $250,000; constructing highway between Monroe and Woodinville, $900,000, replacing with fill bridge on Everett-Mukilteo Hy. at Edgewater, $65,000, all Snohomish Co.

PLANS UNDER WAY

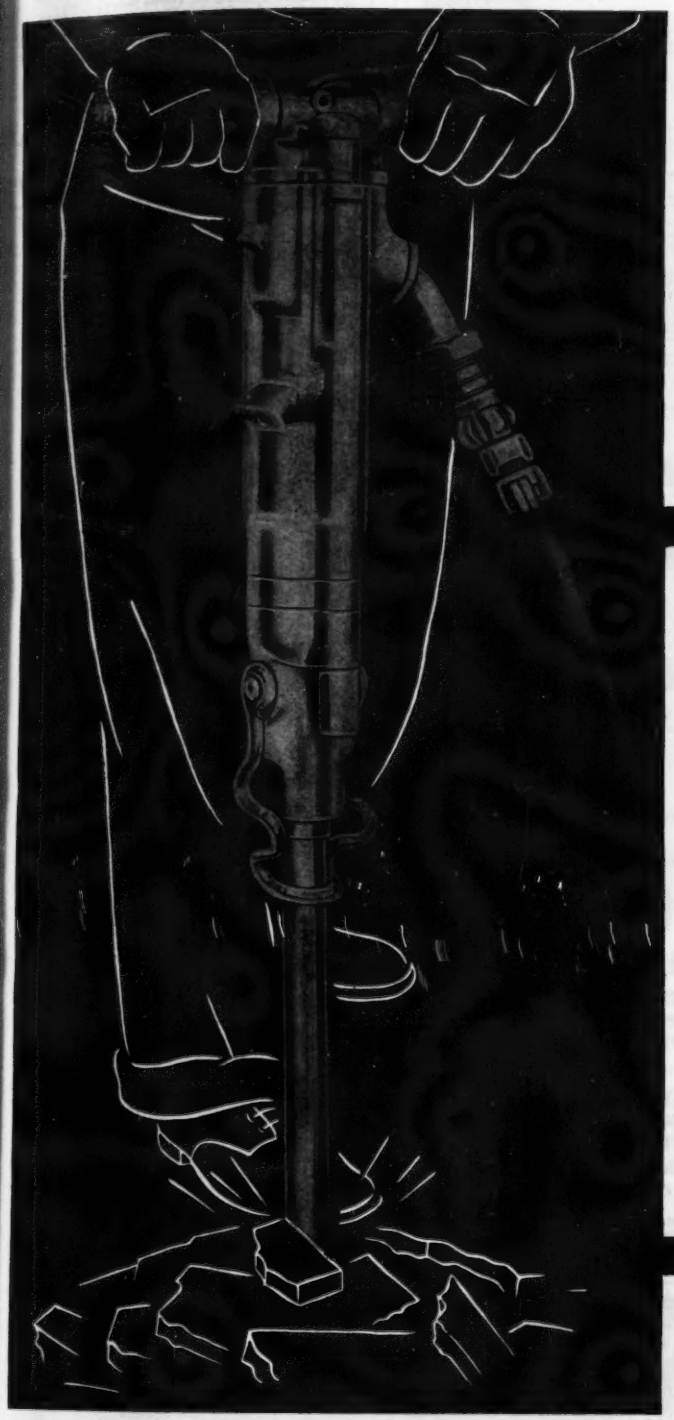
★**California**—State Div. Hys., Public Wks. Bldg., Sacramento, plans under way constructing 15,500 lin. ft. Harbor Parkway, from Pacific Coast Hy. to Battery St., $2,950,000; 61,000 lin. ft. Sepulveda Parkway, Ventura to Venice Blvds., $7,415,200; 7,700 lin. ft. Santa Ana Parkway, Indiana St. to Aliso Viaduct, $1,772,218; Hollywood Parkway, Barham Blvd. to Vineland Ave., $395,500; Hollywood Parkway, Grand to Vermont Aves., $3,902,760; 10,400 lin. ft. Arroyo Seco and Harbor Parkways, Adobe St. to Olympic Blvd., $2,549,728, all foregoing in City of Los Angeles, Los Angeles Co.

★**Calif., Burbank**—City, City Hall, 275 E. Olive St., plans 50% complete grading, asphaltic concrete, paving, concrete curbs and sidewalks, secondary hys., residential streets and alleys, $550,000, financing available; plans 50% completed grading, asphaltic concrete paving, curbing, drainage, Alternate Truck Route, $330,000, land rights not cleared, financing not available. H. R. Bennett, City Hall, engr.

★**Calif., Los Angeles** — City, City Hall, plans under way imprv. Santa Barbara Ave., Van Ness to Sutro Aves., $113,145; Aliso St., San Pedro to Spring Sts., $313,495;

POSTWAR PROJECTS (Cont'd.)

C St., Alameda St. to Figueroa Sts., $302,500; Hill and Castelar Sts.,



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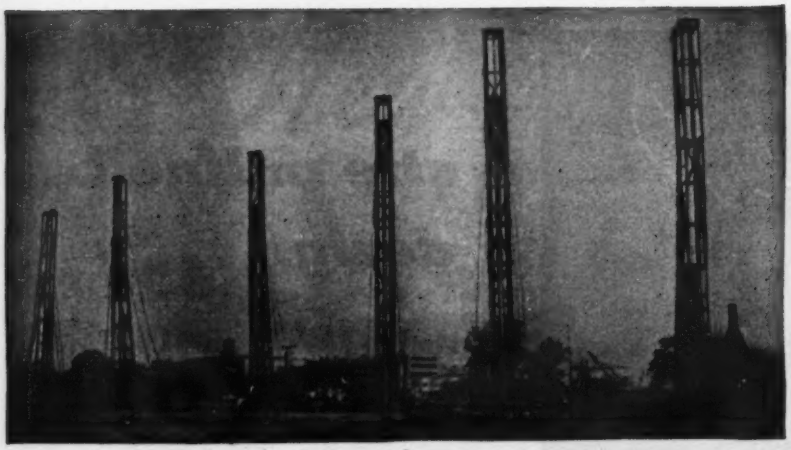

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C St., Alameda St. to Figueroa Sts., $307,500; Hill and Castellar Sts. from north of Ord to Temple Sts., $344,324; Daley Court, Bway. to Pasadena Ave., $42,408; Imperial Hy., Wadsworth to Main Sts., $264,823; Vignes St., Macy to Ducommun Sts., $257,858; Exposition Blvd., Granercy Pl. to Crenshaw Blvd., $224,974; Santa Barbara Ave., Western to Van Ness Aves., $116,691; Santa Barbara Ave., Normandie to Western Aves., $178,017; Olympic Blvd., Berendo St. to Western Ave., $230,770; Olympic Blvd., Los Angeles to Flower Sts., $1,332,005; Western Ave., Torrence Blvd. to 260 St., $286,260; plans imprv. Venice Blvd., Main to Figueroa Sts., $604,280; Washington Blvd., Los Angeles River to Alameda St., $332,980; San Vicente Blvd., Wilshire to Pico Blvds., $355,586; L. Aldrich, city engr.

Ill., Winchester—Scott Co. Hy. Dpt., M. J. Benscoter, supt., plans 80% completed grading, surfacing roads, $150,000. Financing not provided.

Me., Waterville—City, plans streets, $250,000. H. E. Green, city engr.

★**Mass., Chicopee**—City, W. Moreau, supt., streets, plans grading, curbing, drainage, bituminous macadam, bituminous concrete or cement paving, $1,387,904. Financing not available. T. F. Robinson, City Hall, city engr.

Mass., Everett—City, City Hall, Everett, Zone, street reconstruction. $100,000. Financing not available. J. W. Holmes, City Hall, Everett, Zone 49, city engr.

Mo., Columbia—City, plans 50% completed imprv. streets, $300,000. Financing not provided. D. Welch, Columbia, city engr. CD 9/15/43—ENR 9/23/43.

★**Mo., Independence**—City, imprv. streets, $530,000. H. A. Jones, city engr.

★**Mont., Great Falls**—City, plans oiled gravel paving 900 blks. $2,000,000. Financing not provided. E. Henen, Civic Center, city engr.

N. H., Concord—City, plans 75% completed relocating road, culvert, $54,862. Financing not provided. E. E. Beane, city engr.

N. Y., Dunkirk—City, City Hall, plans exten. Main St. to Fredonia village line, $85,000. H. Stumpf, City Hall, acting city engr.

N. D., Minot—City, plans 80% completed replacing wood block paving, $60,000. L. G. Wilhelm, city engr.

★**Washington**—State Hy. Dpt., Olympia, plans under way reconstructing 7.8 mi. Stevens Pass Hy., between Snohomish and Monroe, $507,000; relocating, etc., 16 mi. hy. between Snohomish and Arlington, $700,000, both Snohomish Co. CD 2/15/43—ENR 2/18/43.

READY FOR BIDS

★**La., Jennings**—Jefferson Davis Parish Police Jury, plans completed rein.-con., concrete and asphalt paving, curbing, guttering 21 mi. roads, $700,000. Financing available. Barnard & Burk, 312 Triad Bldg., Baton Rouge, consult. engr. CD 12/5.

★**Mo., St. Joseph**—Bd. P. Wks., A. J. Branum, pres., plans completed opening, imprv. Robidoux St., $82,245, Highly St., $48,360, Holman St., $16,190, 5 Ave., $41,396, Pacific St., $146,985, Diagonal Ave., $324,330, Ridenbaugh St., $39,124, Buchanan Ave., $82,245; widening Monterey St., $35,803, Rochester Rd., $34,826, St. Joseph Ave., $34,000, Messanie St., $34,000; resurfacing 25 St., $22,222, Colhoun St., $7,480, 19 St., $4,905, Messanie St., $10,068, Charles St., $1,380, Sylvanie St., $1,044, 11 St., $1,280; concrete resurfacing Farson St., $36,423; paving North and South Alley between 16 and 17 Sts., $1,350, alley between 2 and 3 Sts., $1,080; crushed rock surfacing dirt streets and alleys, $25,000. Financing available.

EARTHWORK, WATERWAYS

PROPOSED WORK

★**Md., Baltimore**—City, City Hall, plans harbor imprvs. $850,000 bonds voted. CD 10/21/43—ENR 10/28/43.

PLANS UNDER WAY

★**Calif., Los Angeles**—City, City Hall, plans restoring, protecting and developing 13 mi. ocean beach, groins, drive, concessions, boardwalk, parks, playgrounds and yacht facilities. $10,922,000. L. Aldrich, City Hall, city engr. CD 5/24—ENR 6/1.

★**Miss., Jackson**—City, City Hall, plans completed enlarging, straightening, paving Town Creek, 1.5 mi. thru business dist., removing existing structures, culverts, bridges, etc. $619,000. Land rights not cleared, legal obstacles to be overcome, financing not provided. Black & Veatch, 4706 Bway., Kansas City, Mo., consult. engrs. J. J. Halbert, city engr.

★**Ore., Astoria**—Port of Astoria, City Hall, plans completed fishing fleet mooring basin, incl. 3,000 ft. treated piling bulkhead, converting cannery into 100x650 ft. dock, $530,000. Financing not provided. O. Herman, c/o Gilpin Constr. Co., 4850 N.W. Front St., Portland, consult. engr.

★**Tex., Galveston**—City of Galveston and Galveston Co. Drainage Dist., revised plans 1% completed drainage for mainland.

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POSTWAR PROJECTS (Cont'd.)

$1,500,000. Financing not provided. Ford Bacon & Davis, 39 Bway., New York, N. Y., consult. engrs. C. C. Washington, Court House, co. engr. CD 7/10—ENR 7/21.

READY FOR BIDS

Fla., Jacksonville—City, plans completed yacht basin for Recreation Dpt. $150,000. Financing available. W. E. Shedden, Engineers Bldg., city engr.

LATIN AMERICA

Brazil—Republic of Brazil, Rio de Janeiro, plans hydro-electric development; completing coastal system of railroads from Urugayan border to Belen and secondary system to connect with interior railroads; highway network program, iron and steel plant and mining development. $2,500,000,000.

Cuba, Havana—Republic of Cuba, Havana, plans chemical plant addn. $350,000.

PUBLIC BUILDINGS

PROPOSED WORK

Minn., Duluth—State Teachers College Bd., State Office Bldg., St. Paul, physical education bldg. $437,000. Financing not available.

★ **Minn., Minneapolis**—State Soldiers Home Bd. W. E. Downey, commandant, Minnehaha Falls, plans buildings, and impry. present buildings. $500,000.

Minn., Moorhead—State Teachers College, State Office Bldg., St. Paul, plans science, mathematics and industrial arts bldg. $350,000. Financing not available.

Minn., St. Cloud—State Teachers College, State Office Bldg., St. Paul, heating plant $160,000; classroom bldg. $165,000. Financing not available.

★ **Mo., St. Joseph**—Bd. P. Wks., A. J. Branum, pres., plans memorial bldg. south of city hall; $750,000, storage garage at 8 and Sycamore Sts., $45,025.

★ **Mo., University City (br. St. Louis)**—Bd. Educ., W. L. Metcalfe, pres., 6701 Delmar Blvd., University City, St. Louis Zone 5, plans schools and addns. $800,000-$1,200,000. Bond election in February or March.

Mont., Anaconda — Anaconda Housing Auth., Anaconda, 60 public housing units. $200,000.

★ **Mont., Helena**—Helena Housing Auth., Helena, plans 125 housing units. $500,000.

★ **N. Y., Brooklyn**—New York City Housing Auth., 122 E. 42 St., New York, Zone 7, 1,800 housing units, Bushwick area, $10,800,000; 500 units East New York area, $3,000,000; 1,060 units Greenpoint area, $6,360,000; 1,300 units Greenwood area, $7,800,000; 820 units Kingsboro Homes exten. $4,920,000. Applied for federal housing funds.

★ **N. Y., Jamaica**—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, plans 600 housing units addn. at South Jamaica Homes. $3,600,000. Applied for federal housing funds.

★ **N. Y., New York**—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, plans 1,700 unit housing East Harlem area, $10,200,000; 1,860 units Lower East Side $11,160,000; 1,300 units Upper Manhattan, $7,800,000; 2,350 units Harlem area, $14,100,000; 900 units Vladeck Houses exten. $5,400,000. Applied for federal housing funds.

★ **N. Y., New York**—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, plans 1,000 housing units, Bronx River area, $6,000,000; 1,800 units Bronx Gate area $10,800,000; 1,400 units Caldwell-Tinton area, $8,400,000. Applied for federal housing funds.

★ **N. Y., Rockaway**—New York City Housing Auth., 22 E. 42 St., New York, Zone 17, plans 650 unit housing. $3,900,000. Applied for federal housing funds.

★ **N. Y., West New Brighton**—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, 260 unit housing. $1,560,000. Applied for federal housing funds.

★ **N. C., Raleigh**—State Hy. & P. Wks. Comm., C. Ross, acting chn. plans highway bldg., Newbern Ave. and Wilmington St. To exceed $500,000. Site purchased. CD 6/21—ENR 7/12.

R. I., West Warwick—Town, Bd. Selectmen, plans town hall. To exceed $150,000. Financing not provided.

Tex., Galveston—State Bd. Control, c/o State Psychopathic Hospital, 1014 Strand St., plans hospital addns. $275,000. Financing not provided.

Tex., LaMarque — LaMarque Independent School Dist. plans high school. $400,000. Bonds voted.

Tex., Laredo—City plans city hall. $300,000.

Tex., Laredo—City, plans schools. $150,000.

Wash., Enumclaw — School District 216, school. $420,000.

Wash., Grandview—Grandview Housing Auth., Grandview, plans 40 low rent housing units. $150,000.

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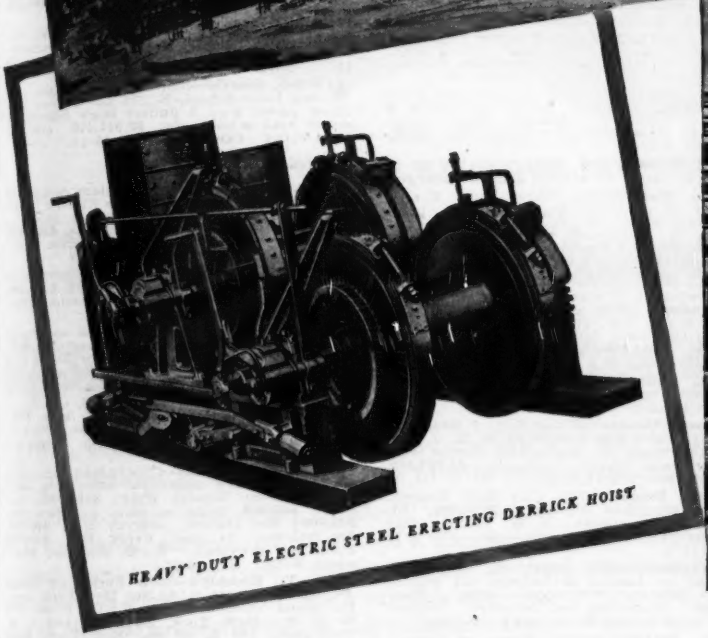

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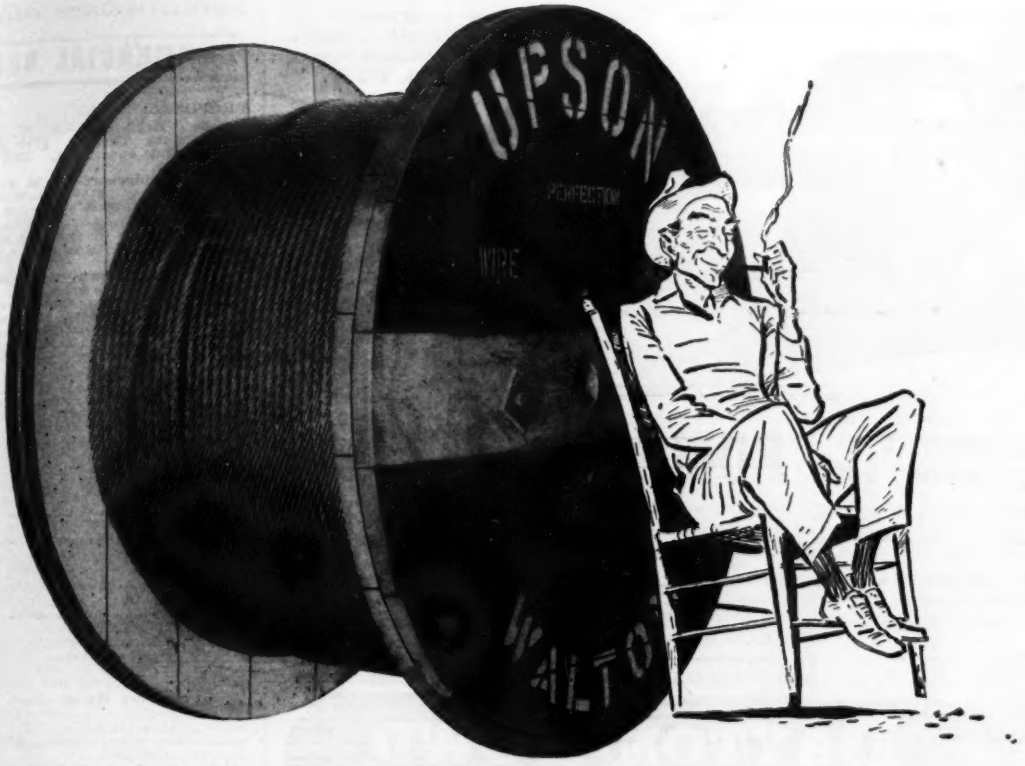

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These are important qualities to you as a buyer. A generation of making wire rope for thousands of users has taught Upson-Walton how to specify and select wire and then fabricate it into rope which keeps all its finest qualities, all these important properties.

All wire rope may look alike when new; rope made from mellow wire keeps on "looking new" and serving the user long after other rope is worn out and gone. It pays in dollars and in longer trouble-free service to specify *Upson-Walton.*

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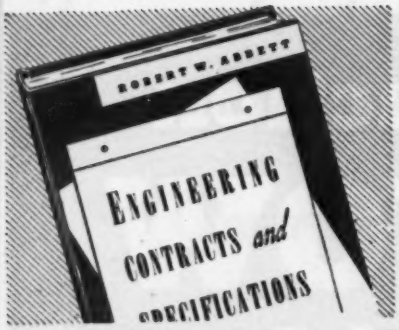

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POSTWAR PROJECTS (Cont'd.)

★**Wash., Kennewick**—Kennewick Housing Auth., Kennewick, plans 125 housing units. $500,000.

★**Wash., Pasco**—Pasco Housing Auth., Pasco, plans 175 housing units. $700,000.

★**Wash., Renton**—School District 403, plans underway schools. $1,322,000. $645,000 bonds voted.

★**Wash., Seattle**—City, plans Firlands Tuberculosis Hospital addn. $3,500,000.

★**Wash., Seattle**—King County Housing Auth., 4 and Cherry Bldg., Seattle, Zone 4, plans 3,072 housing units. $9,000,000.

Wash., Tacoma—State Dpt. Finance, Public Land Bldg., Olympia, plans Naval and Marine Corps Reserve Armory. $150,000.

Wis., Superior — Bd. Educ. plans Blaine School, $270,000. Administration bldg., $75,000; completing Central High School auditorium, $30,000.

PLANS UNDER WAY

★**Calif., Burbank**—City, City Hall, 275 E. Olive St., plans steam electric generating plant addn. $1,500,000. Funds not completely available. H. R. Bennett, City Hall, city engr.

Calif., Burbank—City, City Hall, 275 E. Olive St., plans Public Service Dpt. Office bldg. and yard imprvs. $380,000. Funds available. H. R. Bennett, City Hall, city engr.

★**Calif., Redlands**—Redlands High School Dist., E. Fern Ave., preliminary plans by Marsh, Smith & Powell, Architects Bldg., Los Angeles, 1 and 2 story, rein.-con. bldgs. Redlands High School. $600,000.

Calif., South Pasadena—South Pasadena—San Marino High School Dist. c/o Marsh, Smith & Powell, archts., Archts. Bldg., Los Angeles, preliminary plans completed 2 story, rein.-con. South Pasadena-San Marino High School. $180,000.

★**Conn., Hartford**—City, City Hall, 550 Main St., plans by C. J. Malmfeldt & Associates, 36 Pearl St., brick, stone library, Main, Arch., Prospect and Sheldon Sts. $1,000,000. Financing not provided. CD 3/1—ENR 3/28.

Conn., Storrs—State of Connecticut, State Office Bldg., Hartford, plans by Ebbets & Frid, 15 Lewis St., Boston, Mass., synagogue at University of Connecticut. $150,000. CD 1/5/45.

Kan., Winfield—Bd. Educ. plans by W. N. Caton, Winfield, vocational school. $200,000.

★**Md., Hagerstown**—State Dpt. Health, 2411 N. Charles St., Baltimore, plans 10% completed by B. Evander, 326 N. Charles St., Baltimore, Zone 1, Hospital for Chronic Diseases. $900,000. CD 5/26—ENR 6/15, under Maryland.

Mass., Belchertown—Dpt. Mental Health, Commonwealth of Massachusetts, 100 Nashua St., Boston, plans completed by Kendall Taylor & Co., Inc., 211 Columbus Ave., Boston, brick, steel infirmary, PM 38, State Hospital. $315,000. Financing not provided. CD 2/17—ENR 3/9.

Mass., Chicopee — City, Cabot St., plans brick, steel fire station. $250,000. T. F. Robinson, city engr.

★**Mass., Chicopee**—School Dpt., J. Desmond, supt. plans 50% completed by H. J. Tessier, 220 Dwight St., Springfield, Junior High School; trade school; 2 schools. $1,007,500. CD 9/29/43—ENR 10/7/43.

★**Mass., Everett**—City, City Hall, Everett, Zone 49, plans city hall. $750,000. Financing not available. J. W. Holmes, City Hall, Everett, Zone 49, city engr. CD 3/16—ENR 4/6.

Mass., Sharon—Bd. Selectmen, Town Hall, sketches by Leland & Larsen, 814 Statler Bldg., Boston, municipal bldg. Over $150,000. Financing not provided. Project to be voted on at March town meeting.

Mich., Detroit—Detroit House of Correction, Northville, plans laundry bldg., Northville, $100,000. G. B. Thompson, City Hall, city engr.

★**Mich., Detroit**—Detroit Housing Comm., 409 Griswold St., plans under way six slum clearance projects. $28,000,000. G. R. Thompson, City Hall, city engr.

★**Mich., Houghton**—Michigan State Administrative Bd., Lansing, plans under way by St. Clair Pardee, St. Johns, tuberculosis sanitarium, Upper Peninsula, near here. $500,000.

★**Mo., Independence**—City, plans 50% completed light plant addn., imprv. distr. sys. $700,000. Black & Veatch, 4706 Bway., Kansas City, Mo., consult. engrs. H. A. Jones, city engr.

N. H., Glencliff—State of New Hampshire, Governor's Office, State House, sketches by N. P. Bandlett, Laconia, hospital $310,000; plans altering administration and service bldg., $150,000. Financing not provided. CD 3/1/43—ENR 3/4/43.

★**N. Y., Brooklyn**—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, plans 70% completed by E. J. Kahn, 2 Park Ave., New York, Zone 16, R. Candela, 110 E. 42 St., New York, Zone 17 and W. T. McCarthy, 310 Ashland Pl., Brooklyn, Zone 17, Gowanus Housing, Wycoff, Bond, Baltic and Hoyt Sts. $3,200,000. Financing available. CD 7/15/43—ENR 7/22/43.

★**N. Y., Bro...** New York City Housing Auth., 12... 42 St., N... York, Zone 17, plans 50% completed ... Voorhies, Walker, Foley & Smith, 101 P... Ave., New York, Zone 17, F. P. Platt & ... 221 W. 57 St., New York, Zone 19, and ... Goldberg, 16 Montague St., Brooklyn, Zone 2, Marcy Housing, Marcy, Myrtle, Flushing and Park Aves., $10,429,000. Financing available. CD 6/15/43—ENR 7/27/43.

★**N. Y., New York**—New York Housing Auth., 122 E. 42 St., New York, Zone 17, plans 98% completed by F. ... Ackerman, 22 W. 44 St., and L. A. Goldstone, 25 W. 44 St., New York, Zone 18, Lillian Wald Housing, Avenue D, East River Dr., 6 and Houston Sts. $12,600,000. Financing available. CD 7/15—ENR 7/29.

★**N. Y., New York**—New York Tunnel Auth., 200 Madison Ave., plans underway 6 story garage, Washington, Greenwich, Morris and Rectors Sts. $1,880,000. J. Quinby, acting engr.- of design.

★**N. Y., West Point**—U. S. Eng., 120 Wall St., New York, Zone 5, plans by Delano & Aldrich, 126 E. 38 St., New York, Zone 16, gymnasium addn., mess hall addn., barracks, academic bldgs., etc. $20,000,000.

Tex., Galena—Galena Park Independent School Dist., plans 10% completed by Hedrick & Lindsley, 811 S. Standard Bldg., Houston, school. $225,000. Financing provided.

Tex., Galveston — Galveston Ind. School Dist., plans 1% completed by R. R. Rapp, Guaranty Bldg., high school. $275,000. Partly financed.

Tex., Longview—Bd. Educ., H. L. Foster, supt., plans 1% completed by P. M. Geren, 306 Burnet St., Fort Worth, school and shop. $150,000. Partly financed. CD 11/9—ENR 11/30.

★**Wash., Kirkland**—School Dist. 414, plans under way schools. $1,380,000. $200,000 bonds voted.

★**Wash., Seattle**—Highline School Dist. 401, 253 S. 152 St., plans under way 3 schools. $1,280,000. $300,000 bond issue voted. CD 10/13—ENR 11/2.

★**Wash., Seattle**—Shoreline School Dist. 412, Oak Lake School, N. 103 and Aurora Sts., plans under way 2 Junior High Schools, 1 senior high school, etc. $3,941,470. $300,000 bond voted. CD 11/21—ENR 12/14.

READY FOR BIDS

★**Fla., Jacksonville**—City, plans completed generating stations for City Electric Plant, $5,000,000; increasing transformer capacity, $200,000; high tension distr. system, $300,000. Financing provided. W. E. Shedden, Engineers Bldg., ch. city engr.

★**Fla., Jacksonville**—City, plans completed auditorium for Recreation Dpt. $700,000. Financing available. W. E. Shedden, Engineers Bldg., city engr.

Fla., Jacksonville—City, plans completed central library, $416,400. Financing available. W. E. Shedden, Engineers Bldg., city engr.

Fla., Jacksonville—City, plans completed warehouse and storeroom $36,954, equipment sheds $55,075 and administration bldg. $32,000 both for Street Cleaning Dpt. Financing available. W. E. Shedden, Engineers Bldg., city engr.

★**Fla., Jacksonville**—City, plans completed city hall and municipal office bldg., $1,650,000, Dept. Health Bldg., $150,000; firehouse $40,000, machine shop for Fire Dpt. $30,000; fire station, Murray Hill, $40,000, fire station, 34 and Perry Sts., $40,000. Financing provided. W. E. Shedden, Engineers Bldg., city engr.

★**N. Y., Brooklyn**—**New York** City Housing Auth., 122 E. 42 St., New York, Zone 17, plans completed by F. G. Frost, 144 E. 30 St., New York, Zone 16, and J. A. Thompson, 140 E. 39 St., New York, Zone 16, Brownsville Housing, Stone, Sutter, Dumont and Rockaway Aves., $8,260,000. Financing available. CD 6/17/43—ENR 6/24/43.

Ready for Bids

Of $17,000,000,000 of proposed postwar construction at beginning of 1945 only $500,000,000 was reported "ready for bids", with plans complete and financing available.

If you have projects "ready for bids", please send them in to be added to the total above to give a measure of the materials that will be needed to relax restrictions and go ahead with civilian work.

Send ready-for-bids projects news to Elsie Eaves, Manager, Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y.

PROJECTS CANCELLED.

Minn., Jackson—City, A. W. Wallace, clk. cancelled plans furnishing, installing 2,000 kw. turbine generator unit, surface condenser and auxiliary equip., for municipal power plant. $80,000. CD 6/22—ENR 2/24.

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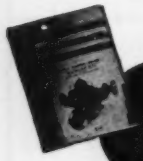

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COMMERCIAL BUILDINGS

PROPOSED WORK

Conn., Bridgeport—A. M. Schuman, c/o Black Rock Theater, 2740 Fairfield Ave., brick, steel apartment. Site not selected. $150,000.

Conn., Bridgeport—A. M. Schuman, Black Rock Theatre, 2740 Fairfield Ave., plans theatre. $185,000. Financing not provided.

Conn., Hartford—J. M. Chernoff, et al, 61 Wardwell Rd., West Hartford, plans theatre, Main St. $200,000. Financing not provided.

Conn., Middletown—Middlesex Hospital, 28 Crescent St., plans brick, steel hospital addn. $150,000. Financing not provided.

Conn., Milford—G. Haskins, Cedarhurst Lane, plans housing development, Forest Heights. To exceed $150,000. Financing not provided.

Conn., Stamford—J. Drucker, 38 Van Rensselaer Ave., plans housing, 60 acre site. To exceed $150,000. Financing not provided.

★**Md., Baltimore**—Bernard De Borkey and Associates, 3902 Hilton Rd., plans 400 to 450 two story, bsmnt. residences, on 60 acre tract, Reisterstown and Seven Mile Rds. $1,500,000.

★**Md., Baltimore**—Woodbourne Realty Co., 208 Lexington St., plans two hundred forty 2 story, bsmnt., brick, stone residences. $1,500,000.

★**Mass., Framingham**—Framingham Union Hospital, Framingham, plans hospital addn., alterations. $600,000.

Mass., Framingham—Union Hospital Bd. Trustees, E. Sears, chn., Pelham Island Rd., Wayland, plans brick, steel hospital addn. To exceed $150,000.

Mass., Leominster—Bd. Trustees Leominster Hospital Assn., B. W. Doyle, vice pres., plans brick, steel hospital addn. $150,000. Financing not provided.

★**Mich., Port Huron**—Port Huron District Foundation, Chamber of Commerce, Port Huron, plans recreation center, incl. stadium, auditorium, playgrounds. $500,000. Financing not provided.

Mo., Overland (br. St. Louis)—Schuermann Bldg. & Realty Co., 6104 Easton Ave., St. Louis, Zone 12, bungalows on 102 acre tract, Brown and Lackland Rds. To exceed $150,000. Site purchased.

★**Mo., St. Louis**—Lutheran Laymen's League, A. A. Welp, pres., Manchester Rd., Kirkwood, St. Louis, Zone 22, plans rein.-con., brick, steel high school. $500,000-$600,000.

★**N. Y., New York**—Beekman Hospital, Water and Beekman Sts., New York, Zone 7, plans hospital. $1,500,000.

★**N. Y., New York**—Hebrew Convalescent Home, 3573 Bruckner Blvd., New York, Zone 61, plans 8 story home addn. $1,000,000.

★**N. Y., New York**—Metropolitan Life Insurance Co., 1 Madison Ave., New York, Zone 10, Peter Cooper Village housing, 1st Ave., East River Dr., E. 20 and E. 22 Sts. $8,000,000.

★**O., Columbus**—Julia H. Cherington Memorial Home, c/o Huntington Natl. Bank, 17 S. High St., boy's home. $900,000.

Ore., Portland—First Baptist Church, Rev. R. C. Walker, pastor, 11 and Taylor Sts., plans 3 story, rein.-con., stone education and recreation unit. $150,000. Financing not provided.

★**Pa., Phila.**—Real Estate Trust Co. of Phila., F. C. Roberts, pres., Broad and Chestnut Sts., bank. $500,000-$1,000,000. Financing available.

Pa., Pottstown—Homeopathic Hospital, E. V. Hunter, chn. Bldg. Comn., plans hospital addn., alterations. $175,000. Financing available.

★**Tex., Dallas**—L. P. Lorch & L. J. Hexter & Assocs., Vickery and Main Sts., plans 8 story, bsmnt. merchandise mart, Jackson and Poydras Sts. $1,000,000. Site purchased. Financing available.

Tex., Fort Worth—First Assembly of God Church, 1326 S. Jennings St., plans church. $150,000.

Tex., Fort Worth—Our Lady of Victory Academy, 3410 Hemphill St., plans 3 college bldgs. $475,000. Financing available.

Tex., Galveston—Dominican Alumnae of Sacred Heart Academy, 1525 Market St., convent. $150,000. Partly financed.

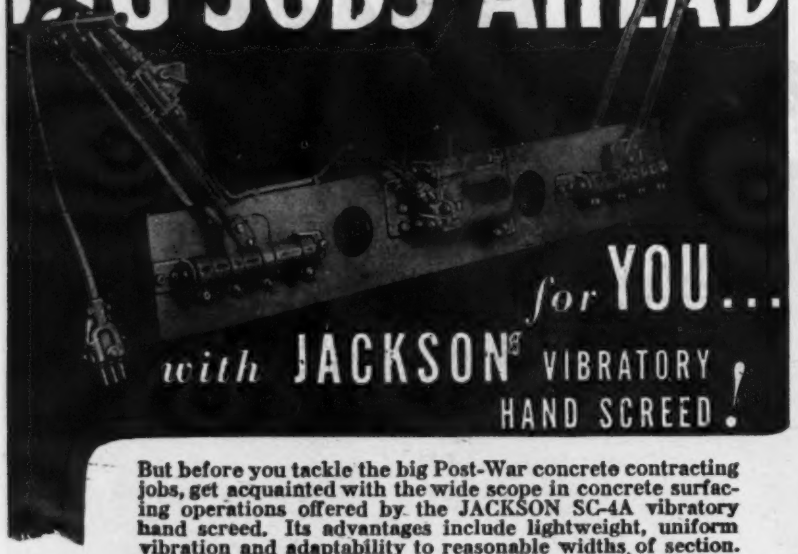
★**Tex., Goose Creek**—Tri Cities, J. M. Kilgore, c/o Humble Refining Co., Baytown, plans San Jacinto Memorial Hospital, near here. $500,000. Financing provided.

Tex., San Antonio—C. Farmer, 215 Guilbeau St., 3 story apartment, Main and Guilbeau Sts. $150,000. Site purchased.

Tex., San Antonio—L. G. Hodges, 510 Harrison Ave., plans 30 dwellings. $225,000. Financing available.

Tex., San Antonio—Methodist Mission Bd., San Antonio, E. Knowlton, 1314 Fred. Rd., plans church. Site purchased.

BIG JOBS AHEAD



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POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

★**Fla., Jacksonville**—Lane Drug Co., 477 Peachtree St., Atlanta, Ga., plans 72% completed 4 story store, Main and Forsythe Sts. **$1,500,000.** Finance available. Private plans. C. O. Mitchell, 377 E. Bay St., Jacksonville, supervisor.

★**Ind., Crawfordsville**—F. H. Sparks, pres., plans by E. Gugler, 101 Park Ave., New York 17, N. Y., 2 dormitories, Natural Science Bldg., dining room and activities bldg. **$1,125,000.**

Ind., Fort Wayne—Bible Institute, 3819 S. Wayne St., plans by LeRoy Bradley, 3535 St. Joe River Dr., 5 story, brick office and apartment, Rudisill Blvd. and S. Wayne Ave. **$150,000.**

La., New Orleans—Archdiocese of New Orleans, c/o Diboll-Kessels & Assoc., archts., Barrone Bldg., making plans Christian Brothers High School. **$400,000.** Financing not provided.

★**Md., Baltimore**—St. Joseph's Hospital, Oliver and Caroline Sts., sketches by J. R. Edmunds, 409 Calvert Bldg., hospital. **$2,000,000.**

Md., Berwyn—Development Co., c/o P. H. Kea, archt., Professional Bldg., Hyattsville, plans under way 1 story, brick, cinder block stores and theatre. **$200,000.**

Md., Frederick—Hood College, Frederick, plans by J. F. Larson, Hanover, N. H., 1 story, bsmt. Activities Bldg. **$200,000.**

Md., Silver Springs—G. & C. Properties Corp., 927 15 St. N.W., Wash., D. C., preliminary plans by Schreier & Patterson, 917 15 St. N.W., Wash., D. C., theatre, bowling alleys and 23 stores. **$250,000.**

Md., Towson—Owner, c/o Palmer & Lamdin, archts., 1020 St. Paul St., Baltimore, preliminary plans under way 4 story office, **$150,000.** G. Hartman, 105 E. Pleasant St., Baltimore, mechanical engr. Farsant & Kooken, 347 N. Charles St., Baltimore, structural engrs. CD 5/24—ENR 6/1.

Mass., Boston—South End Boy's Club, 1500 Washington St., plans by Andrews, Jones, Biscoe & Goodell, 50 Congress St., 2 story, brick, steel, boys club addn., swimming pool, etc. **$150,000.**

Mass., Brockton—Owner c/o E. L. Currier, archt., 264 Newbury St., Boston, plans completed 60 single family residences, Pearl Ave. To exceed **$300,000.** Financing not provided.

★**Mich., Detroit**—Park-Wood Land Co., c/o C. Howard Crane, Inc., archt., 112 Madison Ave., plans under way 1 and 2 story, brick, stone theatre and stores, etc. **$500,000.**

Minn., Worthington — Worthington Hospital Assn., H. O. Mork, Jr., pres., plans by H. Spitznagel, 309 Western Surety Bldg., Sioux Falls, S. D., hospital. **$250,000-$300,000.**

Mo., St. Louis—F. Wehrenberg, Cinderella Theatre Bldg., Cherokee St. and Iowa Ave., St. Louis, Zone 18, revised plans by A. F. and A. Stauder, 5410 Holly Hills Ave., St. Louis, Zone 9, theatre and stores, Grand Blvd. and Eichelberger St. **$150,000** with equip.

Neb., Omaha—Admiral Theatre Corp., c/o R. Blank, 307 S. 39 St., plans by John Latenser & Sons, 1307 Farnam St., theatre, 24 and L Sts. **$200,000.**

N. Y., DeWitt—Church of Our Lady of Solace, 516 Salt Springs Rd., Syracuse, plans by Maginnis & Walsh, 126 Newbury St., Boston, Mass., brick, stone church and rectory. **$150,000.**

Ore., Portland—Cascade College, 5624 N. Berthwick St., plans completed by D. Edmondson, 511 Henry Bldg., chapel and administration bldg., girls dormitory, music bldg. and gymnasium. **$250,000.** Financing not provided. CD 12/23—ENR 1/11.

Pa., Phila. — Conwell Memorial Church Baptist Temple, G. R. Sweet, pastor, 7517 Woolston Rd., plans by J. H. Jones, 1225 Bancroft Parkway, Wilmington, Del., education bldg. **$175,000.** Fund campaign under way.

Pa., Phila.—Lankenau Hospital, P. D. Bonnet, Corinthian St. and Girard Ave., making surveys altering hospital. To exceed **$150,000.** Financing available. United Engineers & Constructors, 1401 Arch St., Phila., consult. engrs.

★**Pa., Somerton**—Owner, c/o G. S. Idell, archt., 1510 Chestnut St., Phila., plans 60% completed 400 residences. **$2,200,000.**

Tex., Arlington—Baptist Church, plans 10% completed by T. D. Broad, Burt Bldg., Dallas, church. **$150,000.**

Tex., Brownsville—Gill & Associates, Gunter Hotel, San Antonio, plans 50% completed by F. Green, Glendale, Calif. and c/o owner, tourist courts. **$400,000.** Financing available. CD 6/23—ENR 6/29, under Commercial.

★**Tex., Dallas**—St. Paul Hospital, 3121 Bryan St., Dallas, plans 1% completed by T. D. Broad, consult. archt., Burt Bldg., hospital annex. **$500,000.** CD 8/24—ENR 9/7.

Wis., Milwaukee—Owner, c/o J. T. Topzant, archt., 424 E. Wells St., Milwaukee, Zone 2, 8 story apartment, E. State and N. Astor Sts. Financing not provided.

POSTWAR PROJECTS (Cont'd.)

READY FOR BIDS

Ore., Portland—H. D. Cook, 3440 S.W. Veterans Hospital Rd., plans completed by F. S. Harrison, 715 N.E. Couch St., 6 story hotel apartment and theatre. **$250,000.** Financing available. CD 1/5.

CONTRACTS AWARDED

★**Md., Silver Springs**—Indian Spring Town & Country Club, Silver Springs, will construct clubhouse, swimming pool, 7 tennis courts, Colesville Rd. Owner builds. **$700,000.** F. Ackerman, 551 5th Ave., New York, archts.

★**Mo., St. Louis**—N. J. Risch, c/o Risch Bldg. & Real Estate Co., 9100 Gravois Ave., Sappington, St. Louis County, St. Louis, Zone 23, will construct 172 houses, in St. Louis Co., own forces. Est. **$500,000.** Site purchased.

★**N. Y., New York**—Mutual Life Insurance Co., 34 Nassau St., New York, Zone 5, 3 story bank, 508-14 5 Ave., to George A. Fuller Co., 597 Madison Ave., New York, Zone 22. Est. **$1,000,000.** CD 12/7—ENR 12/28.

PROJECTS CANCELLED.

★**La., Alexandria**—Baptist Hospital, Alexandria, cancelled plans hospital. **$600,000.** Work going ahead at once. CD 11/15—ENR 11/30.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ind., Jasper—PLANT—Eckstein Furniture Co., Jasper, plans furniture plant. **$50,000.**

Mo., St. Louis—FACTORY—Fulton Mower & Mfg. Co., 2436-38 N. Grand Blvd., St. Louis, Zone 6, plans factory, office and sales bldg., Hy. 140, near Hy. 66, St. Louis County. 6 acre site purchased.

Mo., St. Louis—PLANT—Ideal Plumbing & Heating Service Co., 4301 S. Kingshighway, St. Louis, Zone 9, plans 2 story, bsmnt., brick, concrete plant addn. **$40,000** with equip.

Mo., St. Louis — WAREHOUSE — United States Steel Supply Co., 716 S. 21 St., St. Louis, Zone 3, plans warehouse, Sarah St. and Duncan Ave. **$40,000.** Site purchased.

PLANS UNDER WAY

Conn., Glenbrook — FACTORY — Audio Manufacturing Co., 25-29 Parker Ave., plans coating factory addn., warehouse, boiler and laboratory. To exceed **$40,000.** R. Deck, c/o owner, engr. Financing not provided.

★**Ia., Des Moines**—PLANT—Ford Motor Co., Dearborn, Mich., plans under way 1 story, brick, steel, concrete service parts bldg. **$700,000.**

Md., Baltimore—REFINERY—Continental Oil Co., Ponca City, Okla., plans under way oil refinery plant addn. Private plans.

Md., Baltimore—PLANT—H. B. Davis Co., Bayard and Severn Sts., plans by H. P. Hopkins, 10 E. Mulberry St., paint plant. **$100,000.**

Mass., New Bedford—SERVICE STATION—Pacific Oil Co., 348 Central St., Fall River, plans by S. T. Dubitsky, 771 Rock St., Fall River, super service station, Kempton St. To exceed **$40,000.** Land purchased.

R. I., Newport—SERVICE STATION—Pacific Oil Co., 348 Central St., Fall River, Mass., plans under way by S. T. Dubitsky, 771 Rock St., Fall River, Mass., super service station, Thames and Marlboro Sts. To exceed **$40,000.**

Tex., Austin—PLANT—The Stack Co., 217 W. 9 St., plans 25% completed by C. H. Page & Son, Gracy Bldg., 7 story, 50x130 ft. printing plant. **$100,000.** Financing available.

Tex., Dallas—WAREHOUSE—L. A. Friester Co., 1100 Cadiz St., plans 25% completed by M. Peterman, 5230 Monticello St., 75x105 ft. warehouse. **$50,000.**

Tex., San Antonio — STORAGE — Studer Photo Co., 402 San Pedro St., plans 25% completed storage and studio bldg. **$50,000.** Financing provided. CD 10/20—ENR 10/26, under Industrial Buildings.

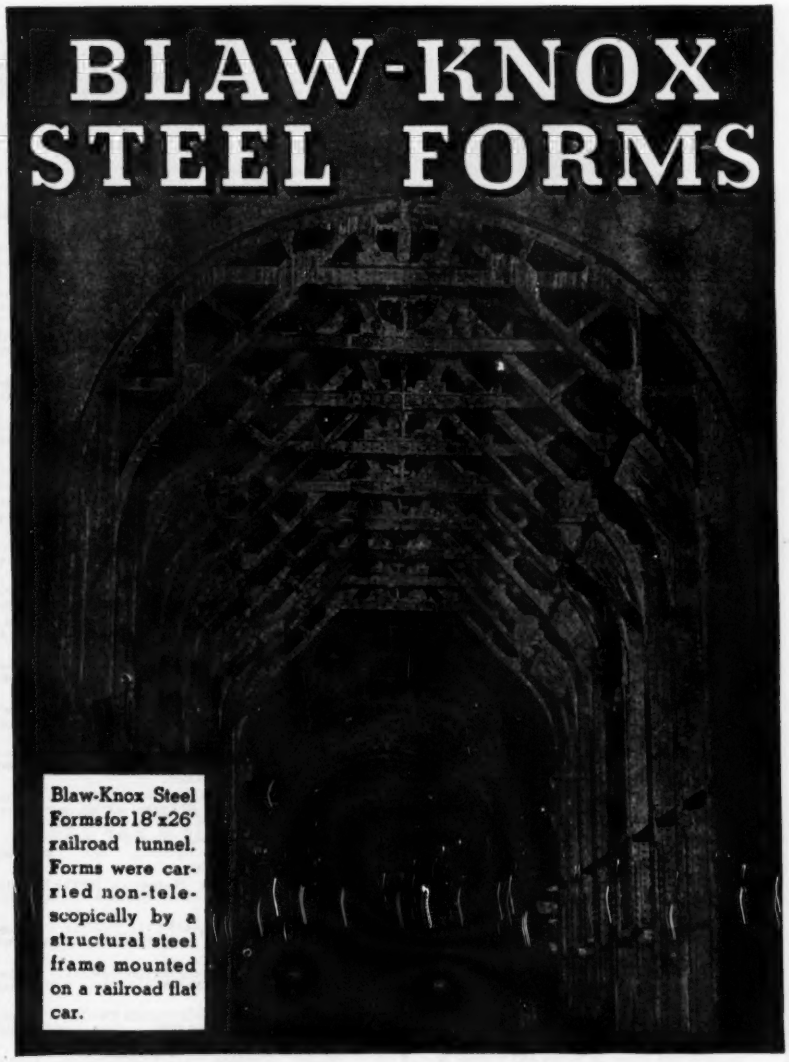
PROJECTS CANCELLED.

Tex., San Angelo—REPAIR SHOP—Westbrook Motor Co., San Angelo, cancelled plans 1 story, repair shop and auto storage bldg. **$50,000.** Work going ahead now. CD 12/28—ENR 1/11.

UNCLASSIFIED

PROPOSED WORK

★**Calif., Los Angeles**—PLAYGROUNDS, etc.—City, imprv. Hostetter Playground **$45,620,** Hollywood Dist. Playgrounds **$277,210,** Wilshire Dist. Playground **$215,210,** Highland Park Playground, incl. bathhouse, swimming pool, **$54,107,** Orcutt Playground **$31,466,** Tijera and Sepulveda Playground **$125,000,** Hoover and Vernon Neighborhood Playground **$125,000,** Sunland Playground **$87,595,** Daniels Field Playground **$27,000,** playfields and courts at Everygreen Play-



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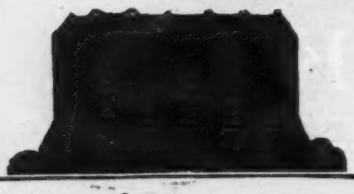

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POSTWAR PROJECTS (Cont'd.)

ground $33,000, San Pedro Neighborhood Playground $125,000, Wilmington Dist. Playground $277,210; imprv. and protection work at Cabrillo Beach, $126,500. G. Hjelte, City Hall, supt. Recreation.

Idaho, Coolin—AIRPORT—City, airport grading, etc. $91,000. CAA will help finance.

Idaho, Dixie — AIRPORT — City, airport grading. $75,000. CAA will help finance.

Idaho, Dubois—AIRPORT—City, airport grading, paving, lighting, etc. $190,000. CAA will help finance.

Idaho, Elk City—AIRPORT—City, airport grading, etc. $96,000. CAA will help finance.

Idaho, Emmett—AIRPORT—City, airport grading, etc. $60,000. CAA will help finance.

Idaho, Glenns Ferry — AIRPORT — City, airport grading, etc. $90,000. CAA will help finance.

Idaho, Jerome—AIRPORT—City, airport grading, etc. $70,000. CAA will help finance.

Idaho, Kamiah—AIRPORT—City, airport grading, etc. $53,000. CAA will help finance.

Idaho, Kaniksu—AIRPORT—City, airport grading. $75,000. CAA will help finance.

Idaho, Kaufman—AIRPORT—City, airport grading, etc. $62,000. CAA will help finance.

Idaho, Leadore—AIRPORT—City, airport grading, etc. $71,000. CAA will help finance.

Idaho, Mackay—AIRPORT—City, airport grading, etc. $47,000. CAA will help finance.

Idaho, Malad City—AIRPORT—City, airport grading, paving. $200,000. CAA will help finance.

Idaho, Malta — AIRPORT — City, airport grading, lighting, etc. $155,000. CAA will help finance.

Idaho, Martin—AIRPORT—City, airport grading, etc. $85,000. CAA will help finance.

Idaho, McCall — AIRPORT — City, airport grading, paving, lighting, etc. $450,000. CAA will help finance.

Idaho, Moose Creek — AIRPORT — City, airport grading. $75,000. CAA will help finance.

Idaho, Moscow—AIRPORT—City, airport grading, paving, lighting, etc. $465,000. CAA will help finance.

Idaho, Mountain Home—AIRPORT—City, airport grading, etc. $50,000. CAA will help finance.

Idaho, Nampa—AIRPORT—City, airport grading, lighting, etc. $92,000. CAA will help finance.

Idaho, Orofino—AIRPORT—City, airport grading, etc. $50,000. CAA will help finance.

Idaho, Potlatch—AIRPORT—City, airport grading, etc. $50,000. CAA will help finance.

Idaho, Preston—AIRPORT—City, airport grading, paving, lighting, etc. $320,000. CAA will help finance.

Idaho, Rexburg—AIRPORT—City, airport grading, etc. $50,000. CAA will help finance.

Idaho, Riggins—AIRPORT—City, airport grading, etc. $50,000. CAA will help finance.

Idaho, Saint Maries—AIRPORT—City, airport grading, lighting, etc. $108,000. CAA will help finance.

Idaho, Salmon—AIRPORT—City, airport grading, paving, lighting, etc. $390,800. CAA will help finance.

Idaho, Sandpoint—AIRPORT—City, airport grading, etc. $141,000. CAA will help finance.

Idaho, Soda Springs — AIRPORT — City, airport grading, etc. $99,000. CAA will help finance.

Idaho, Stanley—AIRPORT—City, airport grading, etc. $94,000. CAA will help finance.

Idaho, Victor — AIRPORT — City, airport grading, etc. $160,000. CAA will help finance.

Idaho, Wallace-Kellogg — AIRPORT — Cities, airport grading, paving, lighting, etc. $298,000. CAA will help finance.

Idaho, Weiser-Payette—AIRPORT—Cities, airport grading paving, lighting, etc. $239,000. CAA will help finance.

Idaho, Yellow Pine—AIRPORT—City, airport grading, etc. $143,000. CAA will help finance.

Ill., Albion — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Aledo—AIRPORT—City, airport, grading, etc. $25,000.

Ill., Beardstown—AIRPORT—City, airport grading, lighting. $62,000. CAA will help finance.

Ill., Carlinville—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Carlyle—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Carmi — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Carrollton—AIRPORT—City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Carthage—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Champaign—AIRPORT—City, airport lighting, etc. $45,000. CAA will help finance.

Ill., Chester—AIRPORT—City, airport grading, paving, lighting, etc. $304,000. CAA will help finance.

Ill., Clinton—AIRPORT—City, airport grading, lighting, etc. $61,000. CAA will help finance.

Ill., Collinsville—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Decatur — AIRPORT — City, airport lighting, etc. $45,000. CAA will help finance.

Ill., DeKalb — AIRPORT — City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Downers Grove—AIRPORT—City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., DuQuoin — AIRPORT — City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Dwight — AIRPORT — City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., East Moline—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Elmhurst — AIRPORT — City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., Evanston — AIRPORT — City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., Fairfield — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Forest Park—AIRPORT—City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., Franklin Park—AIRPORT—City, airport grading, paving, lighting, etc. $304,000. CAA will help finance.

Ill., Freeport — AIRPORT — City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., Galena — AIRPORT — City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Havana — AIRPORT — City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Highland Park—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Hillsboro — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Hinsdale — AIRPORT — City, airport grading, paving, etc. $64,000. CAA will help finance.

Ill., Homewood—AIRPORT—City airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Hoopeston—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Jacksonville—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Jerseyville—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Kewanee—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Knoxville—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., La Grange—AIRPORT—City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Lansing—AIRPORT—City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Glencoe—AIRPORT—City, airport grading, paving, lighting, etc. $304,000. CAA will help finance.

Ill., Glen Ellyn—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Glenview—AIRPORT—City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Golconda—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Granite City—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Greenville—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

POSTWAR PROJECTS (Cont'd.)

Ill., Harrisburg—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Harvey—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Lawrenceville—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Lincoln—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Litchfield—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Lockport—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Lombard—AIRPORT—City, airport grading, lighting, etc. **$40,000.** CAA will help finance.

Ill., Macomb—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Maywood—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., McLeansboro—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Melrose Park—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Moline—AIRPORT—City, airport grading, paving, lighting, etc. **$365,000.** CAA will help finance.

Ill., Monticello—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Morris—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Morrison—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Mound City—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Mount Carmel—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Mount Morris—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Mount Sterling—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Naperville—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Nashville—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Newton—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Niles Center—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Northbrook—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Oaklawn—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Oak Park—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Olney—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Pana—AIRPORT—City, airport grading, lighting, etc. **$40,000.** CAA will help finance.

Ill., Paris—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Park Ridge—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Pontiac — AIRPORT — City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Princeton—AIRPORT—City, airport grading, lighting, etc. **$40,000.** CAA will help finance.

Ill., Riverside—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Robinson — AIRPORT — City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Rock Island—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Rosiclare—AIRPORT—City, airport grading, etc. **$25,000.**

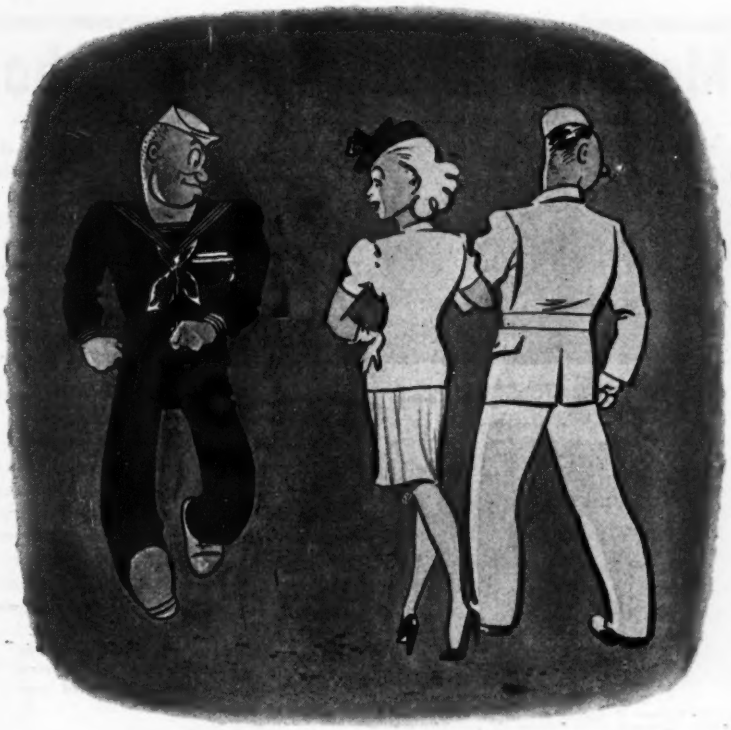
Ill., Rushville—AIRPORT—City, airport grading etc. **$25,000.** CAA will help finance.

Ill., St. Charles—AIRPORT—City, airport grading, paving, etc. **$64,000.** CAA will help finance.

Ill., Salem — AIRPORT — City, airport grading, etc. **$25,000.** CAA will help finance.

Ill., Savanna—AIRPORT—City, airport grading, lighting, etc. **$64,000.** CAA will help finance.

Ill., Schiller Park—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.



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POSTWAR PROJECTS (Cont'd.)

Ill., Shawneetown—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Springfield—AIRPORT—City, airport lighting, etc. $45,000. CAA will help finance.

Ill., Steger — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Sterling — AIRPORT — City, airport grading paving, lighting, etc. $37,000. CAA will help finance.

Ill., Streator — AIRPORT — City, airport grading, lighting, etc. $64,000. CAA will help finance.

Ill., Sullivan — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Taylorville—AIRPORT—City, airport grading, lighting, etc. $40,000. CAA will help finance.

Ill., Tinley Park—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Vandalia — AIRPORT — City, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ill., Villa Park—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Waterloo—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Wheaton — AIRPORT — City, airport grading, etc. $25,000. CAA will help finance.

Ill., Wilmette—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Winnetka—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Wood Dale—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ill., Woodstock—AIRPORT—City, airport grading, etc. $25,000. CAA will help finance.

Ind., Alexandria—AIRPORT—City, grading, lighting, airport. $64,000. CAA will help finance.

Ind., Angola — AIRPORT — City, grading, lighting airport. $40,000. CAA will help finance.

Ind., Attica — AIRPORT — City, grading, airport. $25,000. CAA will help finance.

Ind., Auburn—AIRPORT—City, grading, paving, lighting airport. $365,000. CAA will help finance.

Ind., Bedford—AIRPORT—City, grading, paving, lighting airport. $365,000. CAA will help finance. CD 8/31—ENR 9/21.

Ind., Boonville—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ind., Brazil — AIRPORT — City, grading, paving, lighting airport. $370,000. CAA will help finance.

Ind., Brookville—AIRPORT—City, grading, lighting, etc., airport. $40,000. CAA will help finance.

Ind., Clinton—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ind., Columbia City — AIRPORT — City, grading, airport. $25,000. CAA will help finance.

Ind., Connersville—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ind., Corydon—AIRPORT—City, grading, airport. $25,000. CAA will help finance.

Ind., Crown Point—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Ind., Decatur—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance. CD 4/21—ENR 5/4.

Ind., Delphi — AIRPORT — City, grading, airport. $25,000. CAA will help finance.

Ind., Dunkirk—AIRPORT—City, grading, airport. $25,000. CAA will help finance.

Ind., Elkhart—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Ind., Elwood—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ind., Frankfort—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Ind., Franklin—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Ind., French Lick—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ind., Scottsburg—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Ind., Shelbyville—AIRPORT—City, lighting airport. $64,000. CAA will help finance.

Ind., Spencer—AIRPORT—City, grading, lighting airport. $25,000. CAA will help finance.

POSTWAR PROJECTS (Cont'd.)

Ind., Sullivan—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Ind., Tipton—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Ind., Union City—AIRPORT—City, grading airport. **$64,000.** CAA will help finance.

Ind., Valparaiso—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Ind., Versailles—AIRPORT—City, grading, lighting airport. **$25,000.** CAA will help finance.

Ind., Washington—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Ind., Winamac—AIRPORT—City, grading, lighting airport. **$25,000.** CAA will help finance.

Ind., Winchester—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Ia., Albia—AIRPORT—City, grading, lighting airport. **$114,500.** CAA will help finance.

Ia., Algona — AIRPORT — City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Anamosa—AIRPORT—City, grading, etc. airport. **$34,000.** CAA will help finance.

Ia., Audubon—AIRPORT—City grading airport. **$34,000.** CAA will help finance. CD 1/12—ENR 1/27.

Ia., Belle Plaine—AIRPORT—City, grading, lighting, airport. **$90,500.** CAA will help finance.

Ia., Belmond—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Bloomfield—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Burlington—AIRPORT—City, grading, lighting airport. **$321,000.** CAA will help finance.

Ia., Carroll—AIRPORT—City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Centerville—AIRPORT—City, grading, lighting airport. **$34,000.** CAA will help finance.

Ia., Charlton—AIRPORT—City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Charles City—AIRPORT—City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Cherokee—AIRPORT—City grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Clarinda—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Corning—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Cresco—AIRPORT—City grading airport. **$34,000.** CAA will help finance.

Ia., Creston—AIRPORT—City grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Davenport — AIRPORT — City, plans airport. Ordinance to issue **$160,000** bonds approved.

Ia., Dubuque—AIRPORT—City, grading, paving, lighting airport. **$312,000.** CAA will help finance.

Ia., Elkador—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Fairfield—AIRPORT—City grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Fort Dodge—AIRPORT—City grading, lighting airport. **$114,500.** CAA will help finance.

Ia., Fort Madison—AIRPORT—City grading, lighting airport. **$114,500.** CAA will help finance.

Ia., Glenwood—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Greenfield—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Grinnell—AIRPORT—City, grading, lighting airport. **$114,500.** CAA will help finance.

Ia., Grundy City—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Guthrie Center—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Hamburg—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Hampton—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

Ia., Harlan—AIRPORT—City, grading airport. **$34,000.** CAA will help finance.

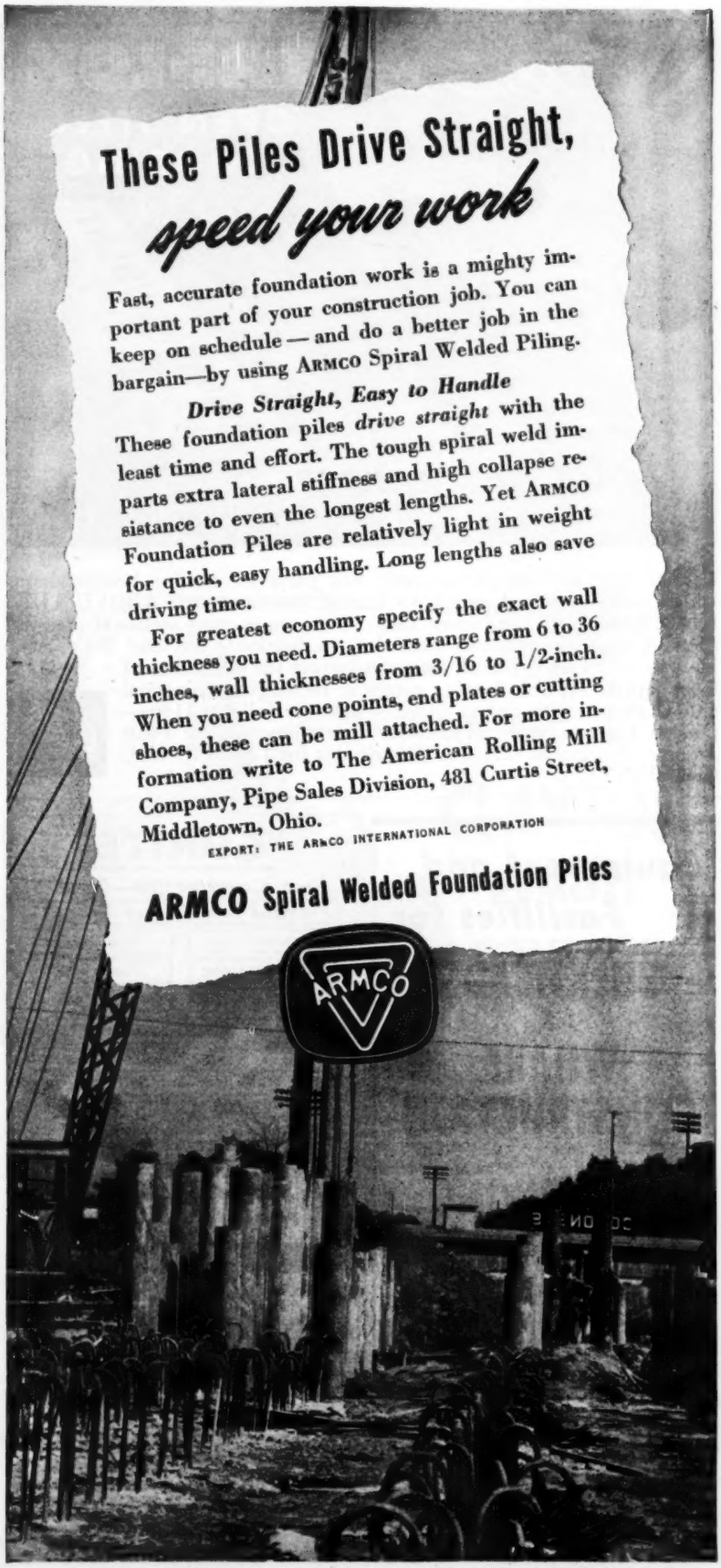
Ia., Iowa Falls—AIRPORT—City, grading, paving, lighting airport. **$114,500.** CAA will help finance.

Ia., Jefferson—AIRPORT—City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Knoxville—AIRPORT—City, grading, lighting airport. **$90,500.** CAA will help finance.

Ia., Lake View—AIRPORT—City, grading airport. **$34,000.** CAA will help finance. CD 12/15/43—ENR 1/3/44.

Ia., Lemars—AIRPORT—City, grading, lighting airport. **$78,000.** CAA will help finance.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POSTWAR PROJECTS (Cont'd.)

Ia., Manchester—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance.

Ia., Marshalltown—AIRPORT—City, grading, lighting airport. $114,000. CAA will help finance. CD 11/17/43—ENR 11/25/43.

Ia., Mason City—AIRPORT—City, grading, paving, lighting airport. $287,000. CAA will help finance.

Ia., Missouri Valley—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Nevada—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Newton—AIRPORT—City, grading, lighting airport. 114,500. CAA will help finance.

Ia., Oelwein—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance.

Ia., Oskaloosa—AIRPORT—City, grading, lighting airport. $114,500. CAA will help finance. CD 4/12—ENR 4/29.

Ia., Ottumwa—AIRPORT—City, lighting airport. $40,000. CAA will help finance.

Ia., Red Oak—AIRPORT—City, grading, lighting airport. $73,000. CAA will help finance.

Ia., Rock Rapids—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance.

Ia., Sac City—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance.

Ia., Sheldon—AIRPORT—City, lighting, etc., airport, $30,000. CAA will help finance.

Ia., Shenandoah—AIRPORT—City, grading, lighting airport. $114,500. CAA will help finance.

Ia., Spencer—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Ia., Storm Lake—AIRPORT—City, grading, lighting airport. $114,500. CAA will help finance. CD 5/26—ENR 6/15.

Ia., Strawberry Point—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance.

Ia., Tama—AIRPORT—City, grading airport. $34,000. CAA will help finance

Ia., Villisca—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Vinton—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Washington—AIRPORT—City, grading, lighting airport. $73,000. CAA will help finance.

Ia., Wauken—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Waverly—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Ia., Webster City—AIRPORT—City, grading, lighting airport. $90,500. CAA will help finance. CD 3/3—ENR 3/23.

Ia., West Union—AIRPORT—City, grading, lighting airport. $114,500. CAA will help finance.

Ia., Winterset—AIRPORT—City, grading airport. $34,000. CAA will help finance.

Kan., Abilene—AIRPORT—City, grading, lighting airport. $93,000. CAA will help finance.

Kan., Atchison—AIRPORT—City, grading, paving, lighting airport. $245,000. CAA will finance.

Kan., Baxter Springs—AIRPORT—City, grading, paving airport. $41,000. CAA will help finance.

Kan., Beloit—AIRPORT—City, grading, lighting airport. $63,000. CAA will help finance.

Kan., El Dorado—AIRPORT—City, grading, lighting airport. $73,000. CAA will help finance.

Kan., Ellsworth—AIRPORT—City, grading, lighting, etc. airport. $51,000. CAA will help finance.

Kan., Emporia—AIRPORT—City, grading, paving, lighting airport. $488,000. CAA will help finance.

★**Md., Baltimore**—ELECTRIC Conduit SYSTEM—City, City Hall, plans exten. electric conduit sys. $800,000 bonds voted. CD 10/21/43—ENR 10/28/43, under Earthwork.

Mass., Brookline—PLAYGROUNDS, etc.—Town, Town Hall, plans exten. playgrounds and recreation centers. $3,500,000. Land rights not cleared, financing not provided.

Mass., Chicopee—PLAYGROUNDS, etc.—City, J. Preston, supt., City Hall, Cabot St., plans developing playgrounds, parks, etc. $400,000.

Mich., Big Rapids—AIRPORT—City, grading airport. $64,000. CAA will help finance.

Mich., Bilsefield—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Bois Blanc Island—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Boyne City—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Cadillac—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

POSTWAR PROJECTS (Cont'd.)

Mich., Caro—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Central Lake — AIRPORT — City, grading airport. $25,000. CAA will help finance.

Mich., Charlevoix—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Charlotte—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Cheboygan—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Chesaning—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★**Mich., Farmington** — AIRPORT — City, grading, paving, lighting airport. $955,000. CAA will help finance.

Mich., Fenton—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Frankfort—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Fraser—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Mich., Fremont—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Gladstone—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Gladwin—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Grand Haven—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Grand Ledge—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Grand Rapids—AIRPORTS—City, grading airport, $25,000; grading, paving, lighting airport, $335,000; grading airport. $25,000. CAA will help finance.

Mich., Greenville—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Gwinn—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★**Mich., Hancock**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

Mich., Harbor Beach—AIRPORT—City, grading, airport. $25,000. CAA will help finance.

Mich., Harrisville—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Hart—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Hastings—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Hillsdale—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Holland—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Houghton Lake—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Howell—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Mich., Hudson—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Ionia—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Iron Mountain—AIRPORT—City, grading, lighting, paving airport. $304,000. CAA will help finance.

Mich., Iron River—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Ironwood—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Mich., Ishpeming—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Jackson—AIRPORT—City, grading, paving airport. $305,000. CAA will help finance.

Mich., Kalamazoo—AIRPORT—City, grading, paving airport. $77,000. CAA will help finance.

Mich., L'Anse—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Lansing—AIRPORT—City, grading, paving, lighting airport. $225,000. CAA will help finance.

Mich., Lapeer—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

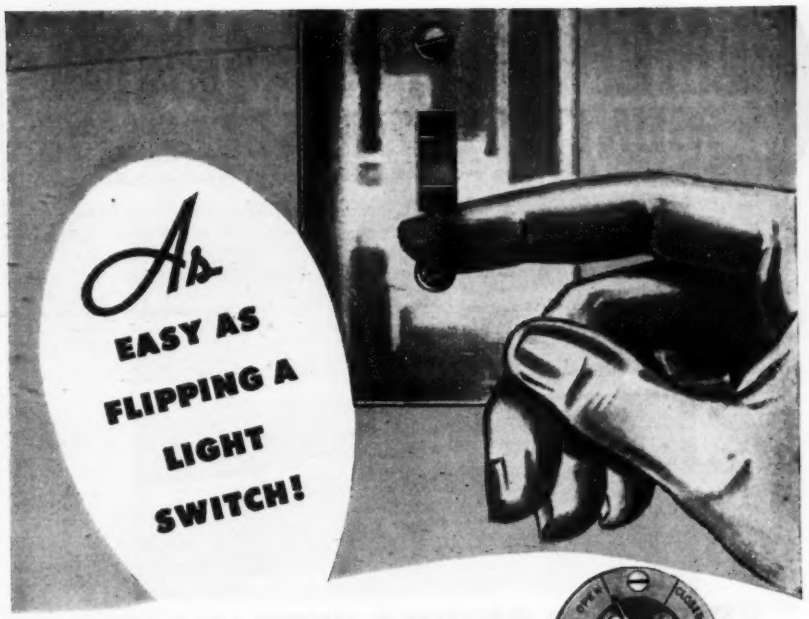
Mich., Larium-Calumet — AIRPORT — Cities, grading, lighting airport. $64,000. CAA will help finance.

Mich., Lowell—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Ludington—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Mich., Mackinac Island—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Mackinaw City — AIRPORT — City, grading airport. $25,000. CAA will help finance.



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POSTWAR PROJECTS (Cont'd.)

Mich., Manistee—AIRPORT—City, grading airport. $64,000. CAA will help finance.

Mich., Manistique—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Marine City — AIRPORT — City, grading, lighting airport. $64,000. CAA will help finance.

★ **Mich., Marquette** — AIRPORT — City, grading, paving, lighting airport. $730,000. CAA will help finance.

★ **Mich., Menominee** — AIRPORT — City, grading, paving, lighting airport. $730,000. CAA will help finance.

Mich., Milford—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★ **Mich., Monroe**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

Mich., Mount Morris — AIRPORT — City, grading airport. $25,000. CAA will help finance.

Mich., Mount Pleasant—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Munising—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Mich., Muskegon—AIRPORT—City, grading, paving, lighting airport. $125,000. CAA will help finance.

Mich., Newberry—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Niles — AIRPORT — City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Northport—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Onaway—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Ontonagon—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Otsego—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Mich., Owosso—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance.

Mich., Paw Paw—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Pellston—AIRPORT—City, lighting airport. $27,000. CAA will help finance.

Mich., Petoskey—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

★ **Mich., Pontiac**—AIRPORT—City, grading, paving, lighting airport. $3,150,000. CAA will help finance.

★ **Mich., Port Huron** — AIRPORT — City, grading, paving, lighting airport. $730,000. CAA will help finance.

Mich., Reed City—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., Rogers City—AIRPORT—City, grading, lighting airport. $64,000. CAA will help finance.

Mich., St. Ignace—AIRPORT—City, grading, lighting, paving airport. $304,000. CAA will help finance.

Mich., St. Johns—AIRPORT—City, grading, lighting airport. $40,000. CAA will help finance.

Mich., Sandusky—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★ **Mich., Sault Ste. Marie**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

Mich., Sebewaing—AIRPORT—City, grading airport. $25,000. CAA will help finance.

Mich., South Haven — AIRPORT — City, grading, lighting airport. $64,000. CAA will help finance.

Mich., Standish—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★ **Minn., Austin**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

★ **Minn., Little Falls**—AIRPORT—City, grading, paving, lighting airport. $1,165,000. CAA will help finance.

★ **Minn., Minneapolis** — AIRPORT — City, grading, paving, lighting airport. $1,400,000. CAA will help finance. CD 2/24—ENR 3/9.

★ **Miss., Aberdeen**—AIRPORT—City, grading, paving, lighting airport. $710,000. CAA will help finance.

★ **Miss., Corinth**—AIRPORT—City, grading, paving, lighting airport. $800,000. CAA will help finance.

★ **Miss., McComb**—AIRPORT—City, grading, paving, lighting airport. $855,000. CAA will help finance.

★ **Miss., Tupelo**—AIRPORT—City, grading, paving, lighting airport. $800,000. CAA will help finance.

POSTWAR PROJECTS (Cont'd.)

★**Miss., Vicksburg**—AIRPORT—City, grading, paving, lighting airport. **$800,000.** CAA will help finance.

★**Mo., Cape Girardeau**—AIRPORT—City, grading, paving, lighting airport. **$829,000.** CAA will help finance.

★**Mo., Columbia**—AIRPORT—City, grading, paving, lighting airport. **$629,000.** CAA will help finance. CD 5/16—ENR 9/7.

★**Mo., Hannibal**—AIRPORT—City, grading, paving, lighting airport. **$593,000.** CAA will help finance.

★**Mo., Marshall**—AIRPORT—City, grading, paving, lighting airport. **$553,000.** CAA will help finance.

★**Mo., Nevada**—AIRPORT—City, grading, paving, lighting airport. **$508,500.** CAA will help finance.

Mo., St. Joseph—WHARF, etc.—Bd. P. Wks. A. J. Branum, pres., plans municipal wharf, **$260,415**; parking lots in business dist. **$100,000.**

★**Mo., Sedalia**—AIRPORT—City, grading, paving, lighting airport. **$583,000.** CAA will help finance.

★**Mo., Tarkio**—AIRPORT—City, grading, paving, lighting airport. **$508,000.** CAA will help finance.

★**Mont., Flathead (mail Ravalli)—Forest (mail Iron Mountain)** — AIRPORTS — Cities, grading 8 airports. **$75,000** each. CAA will help finance.

★**Mont., Hamilton**—Ravalli County, Court House, airport, two 4,000x150 ft. runways, grading, paving, lighting. **$540,000.** CAA will help finance.

★**Mont., West Yellowstone** — AIRPORT — City, grading, paving, lighting airport. **$724,000.** CAA will help finance.

★**Neb., Omaha**—AIRPORTS—City, grading, paving, lighting airport, **$2,625,000**; grading airport, **$30,000**; grading airport, **$30,000**; grading, paving, lighting airport, **$386,000.** CAA will help finance.

★**Nev., Boulder City**—AIRPORT—City, grading, lighting airport. **$825,000.** CAA will help finance.

★**Nev., Las Vegas**—AIRPORT—City, grading, paving airport, **$353,500**; grading, paving, lighting airport. **$391,700.** CAA will help finance.

★**N. H., Berlin**—AIRPORT—City, grading, paving, lighting airport. **$675,000.** CAA will help finance.

★**N. H., Dover-Somersworth**—AIRPORT—Cities, grading, paving, lighting airport. **$1,147,000.** CAA will help finance.

★**N. H., Keene**—AIRPORT—City, grading, paving, lighting airport. **$739,000.** CAA will help finance.

★**N. H., Laconia**—AIRPORT—City, grading, paving, lighting airport. **$574,000.** CAA will help finance.

★**N. H., Manchester** — AIRPORT — City, grading, paving, lighting airport. **$521,000.** CAA will help finance.

★**N. H., Nashua**—AIRPORT—City, grading, paving, lighting airport. **$715,000.** CAA will help finance.

★**N. H., New London** — AIRPORT — City, grading, paving, lighting airport. **$656,000.** CAA will help finance.

★**N. H., North Conway**—AIRPORT—City, grading, paving, lighting airport. **$646,000.** CAA will help finance.

★**N. H., Ossipee**—AIRPORT—City, grading, paving, lighting airport. **$553,000.** CAA will help finance.

★**N. H., Pittsburg**—AIRPORT—City, grading, paving, lighting airport. **$661,000.** CAA will help finance.

★**N. H., Whitefield** — AIRPORT — City, grading, paving, lighting airport. **$749,000.** CAA will help finance.

★**N. H., Wolfboro**—AIRPORT—City, grading, paving, lighting airport. **$906,000.** CAA will help finance.

★**N. J., Asbury Park**—AIRPORT—City, grading, paving, lighting airport. **$1,132,950.** CAA will help finance.

★**N. J., Bendix**—AIRPORT—City, grading, paving, lighting airport. **$1,205,000.** CAA will help finance.

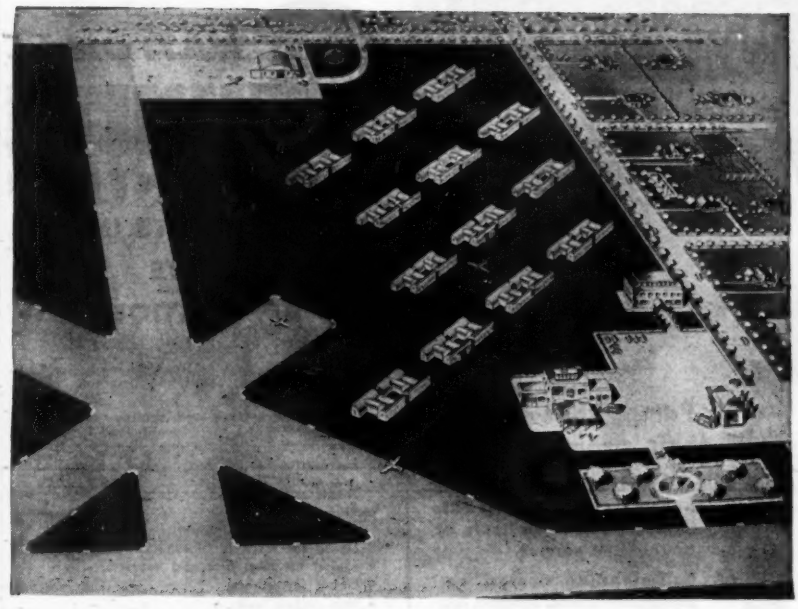
★**N. J., Caldwell**—AIRPORT—City, grading, paving, lighting airport. **$520,300.** CAA will help finance.

★**N. J., Camden**—AIRPORT—City, grading, paving, lighting airport. **$1,730,000.** CAA will help finance.

★**N. J., Elizabeth**—AIRPORT—City, grading, paving, lighting airport. **$1,205,450.** CAA will help finance.

★**N. J., Lakewood**—AIRPORT—City, grading, paving, lighting airport. **$1,128,700.** CAA will help finance.

★**N. J., Livingston** — AIRPORT — City, grading, paving, lighting airport. **$555,000.** CAA will help finance.



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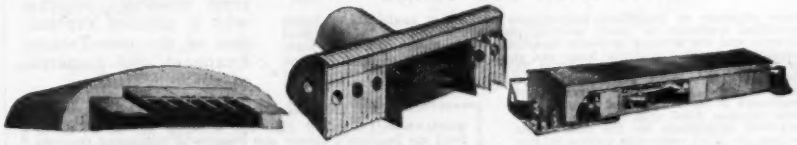

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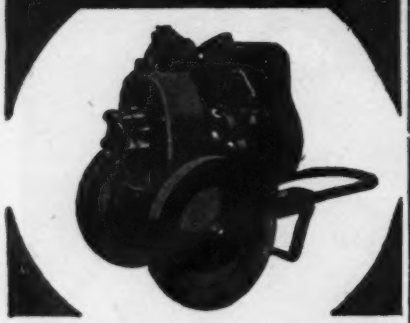

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POSTWAR PROJECTS (Cont'd.)

★**N. J., New Brunswick**—AIRPORT—City, grading, paving, lighting airport. $1,-053,350. CAA will help finance.

★**N. J., North Arlington**—AIRPORT—City, grading, paving, lighting airport. $542,-320.

★**N. J., Orange**—AIRPORT—City, grading, paving, lighting airport. $533,300. CAA will help finance.

★**N. J., Paterson**—AIRPORT—City, grading, paving, lighting airport. $1,466,450. CAA will help finance.

★**N. J., Princeton**—AIRPORT—City, grading, paving, lighting airport. $1,105,350. CAA will help finance.

★**N. J., Trenton**—AIRPORT—City, grading, lighting airport, $101,250; grading, paving, lighting airport, $688,500. CAA will help finance.

★**N. M., Albuquerque**—AIRPORT—City, grading, paving, lighting airport, $488,085; grading, paving, lighting airport, $543,180; paving, lighting airport, $120,857. CAA will help finance.

★**N. M., Beaverhead**—AIRPORT—City, grading, paving, lighting airport. $603,812. CAA will help finance.

★**N. M., Belen**—AIRPORT—City, grading, paving, lighting airport. $686,543. CAA will help finance.

★**N. M., Carlsbad Cavern**—AIRPORT—City, grading, paving, lighting airport. $785,-000. CAA will help finance.

★**N. M., Carrizozo**—AIRPORT—City, grading, paving, lighting airport. $791,549. CAA will help finance.

★**N. M., Chaco Canyon**—AIRPORT—City, grading, paving, lighting airport. $559,-880. CAA will help finance.

★**N. M., Clayton**—AIRPORT—City, grading, paving, lighting airport. $856,210. CAA will help finance.

★**N. M., Cloudcroft**—AIRPORT—City, grading, paving, lighting airport. $570,801. CAA will help finance.

★**N. M., Cuba**—AIRPORT—City, grading, paving, lighting airport. $551,309. CAA will help finance.

★**N. M., Eagle Nest**—AIRPORT—City, grading, paving, lighting airport. $540,-232. CAA will help finance.

★**N. M., Farmington**—AIRPORT—City, grading, paving, lighting airport. $692,-285. CAA will help finance.

★**N. M., Gallup**—AIRPORT—City, grading, paving, lighting airport. $986,249. CAA will help finance.

★**N. M., Hot Springs**—AIRPORT—City, grading, paving, lighting airport. $827,-065. CAA will help finance.

★**N. M., Las Cruces**—AIRPORTS—City, grading, paving, lighting airport, $268,-433; grading, paving, lighting airport, $346,-988. CAA will help finance.

★**N. M., Lordsburg**—AIRPORT—City, grading, paving, lighting airport. $743,325. CAA will help finance.

★**N. M., Lovington**—AIRPORT—City, grading, paving, lighting airport. $511,489. CAA will help finance.

★**N. M., Palma**—AIRPORT—City, grading, paving, lighting airport. $922,845. CAA will help finance.

★**N. M., Portales**—AIRPORT—City, grading, paving, lighting airport. $532,246. CAA will help finance.

★**N. M., Quemado**—AIRPORT—City, grading, paving, lighting airport. $518,-947. CAA will help finance.

★**N. M., Santa Rosa**—AIRPORT—City, grading, paving, lighting airport. $584,-067. CAA will help finance.

★**N. M., Silver City**—AIRPORT—City, grading, paving, lighting airport. $854,-513; grading, paving lighting airport, $289,-806. CAA will help finance.

★**N. M., Springer**—AIRPORT—City, grading, paving, lighting airport. $850,069. CAA will help finance.

★**N. M., Taos**—AIRPORT—City, grading, paving, lighting airport. $1,171,357. CAA will help finance.

★**N. M., Vaughn**—AIRPORT—City, grading, paving, lighting airport. $661,386. CAA will help finance.

★**N. Y., Amsterdam**—AIRPORT—City, grading, paving, lighting airport. $1,-050,450. CAA will help finance.

★**N. Y., Auburn**—AIRPORT—City, grading, paving, lighting airport. $1,054,450. CAA will help finance.

★**N. Y., Buffalo-Niagara**—AIRPORT—Cities, grading, paving, lighting airport. $1,735,000. CAA will help finance.

★**N. Y., Cortland**—AIRPORT—City, grading, paving, lighting airport. $1,040,450. CAA will help finance.

★**N. Y., Hornell**—AIRPORT—City, grading, paving, lighting airport. $859,060. CAA will help finance.

POSTWAR PORJECTS (Cont'd.)

N. Y., **Ithaca**—AIRPORT—City, grading, paving, lighting airport. $549,000. CAA will help finance.

N. Y., **Kingston**—AIRPORT—City, grading, paving, lighting airport. $750,000. CAA will help finance.

N. Y., **Lockport** — AIRPORT — City, grading, paving, lighting airport. $852,000. CAA will help finance.

N. Y., **Newburgh**—AIRPORT—City, grading, paving, lighting airport. $1,206,500. CAA will help finance.

N. Y., **New Rochelle**—AIRPORT—City, grading, paving, lighting airport. $1,510,000. CAA will help finance.

N. Y., **New York** — AIRPORTS — City, grading, paving, lighting airport, $533,320; grading, paving, lighting airport, $468,270; grading, paving, lighting airport, $417,470; grading, paving, lighting airport, $456,270; grading, paving, lighting airport, $383,810. CAA will help finance.

N. Y., **Poughkeepsie**—AIRPORT—City grading, paving, lighting airport. $1,145,960. CAA will help finance.

N. Y., **Pulaski**—AIRPORT—City, grading, paving, lighting airport. $376,000. CAA will help finance.

N. Y., **Ravena-Coeymans** — AIRPORT — Cities, grading, lighting airport. $152,000. CAA will help finance.

N. Y., **Rochester** — AIRPORTS — City, grading airport, $204,625; grading, paving, lighting airport, $553,000. CAA will help finance.

N. Y., **Syracuse**—AIRPORT—City, grading, paving, lighting airport, $360,200; grading, paving, lighting airport, $390,650. CAA will help finance.

N. Y., **Troy** — AIRPORT — City, grading, lighting, paving airport. $655,000. CAA will help finance.

N. Y., **Utica**—AIRPORT—City, grading, paving, lighting airport, $1,133,900; grading airport. $60,000. CAA will help finance.

N. Y., **Yonkers**—AIRPORT—City, grading, paving, lighting airport. $1,510,000. CAA will help finance.

N. C., **Burlington**—AIRPORT—City, grading, paving, lighting airport, $210,000; grading, paving, lighting airport, $480,000. CAA will help finance.

N. C., **Elizabeth City**—AIRPORT—City, grading, lighting, paving airport. $50,000. CAA will help finance.

N. C., **Fayetteville** — AIRPORT — City, grading, paving, lighting airport. $24,000. CAA will help finance.

N. C., **Gastonia**—AIRPORT—City, grading, lighting, paving airport. $600,000. CAA will help finance.

N. C., **Lexington**—AIRPORT—City, grading, paving, lighting airport. $510,000. CAA will help finance.

N. C., **Morganton-Lenoir**—AIRPORT—Cities, grading, paving, lighting airport. $60,000. CAA will help finance.

N. C., **Reidsville**—AIRPORT—City, grading, paving, lighting airport. $630,000. CAA will help finance.

N. C., **Salisbury**—AIRPORT—City, grading, paving, lighting airport. $530,000. CAA will help finance.

N. D., **Valley City**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

N. D., **Williston**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

O., **Akron**—AIRPORTS—City, grading, paving, lighting 2 airports. $608,000. CAA will help finance.

O., **Ashtabula**—AIRPORT—City, grading, lighting airport. $730,000. CAA will help finance.

O., **Bedford**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

O., **Chillicothe**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

O., **Cincinnati**—AIRPORTS—City, grading, paving, lighting airport, $1,600,000; grading, paving, lighting airport, $304,000; grading airport, $25,000; grading, paving, lighting airport, $304,000; grading airport, $25,000. CAA will help finance.

O., **Dayton**—AIRPORTS—City, grading, airport, $25,000; grading, paving, lighting airport, $304,000; grading, lighting airport, $64,000. CAA will help finance. G. F. Baker, city engr. CD 2/3—ENR 2/24.

O., **Gallipolis**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

O., **Hamilton**—AIRPORTS—City, grading, lighting airport, $64,000; grading airport, $25,000; grading, paving, lighting airport, $955,000. CAA will help finance.

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"1" TAPPING MACHINE CAPACITY ⅜" TO 2" Inclusive

"D-4" DRILLING MACHINE CAPACITY 1" TO 2" Inclusive

You probably will have to make new service connections this spring. Why not be ready for this work before the rush begins. That means having plenty of MUELLER corporation stops, gooseknecks, curb stops, and other connections in stock. But most of all it means having the right tools handy. The universally accepted MUELLER Tapping and Drilling Machines are "tops" for this work. First invented by MUELLER in 1871, no other machine has ever approached them for downright simplicity of operation, adaptability to many uses, or real economy. Sixteen different models are available for use on dry pipe or mains under pressure. Capacities vary from ¼" to 12". . . Anticipate your needs and order now, as war-time delays may slow up delivery.

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Corrosion of submerged metal surfaces works fast . . . and eventually destroys the unprotected tank.

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Dayton 10, Ohio

NO PAINT
NO CHEMICALS
RUSTOP
ELECTRO RUST-PROOFING CORPORATION

POSTWAR PROJECTS (Cont'd.)

★**O., Lima**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance. CD 12/27/43—ENR 1/13/44.

★**O., Marion**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

★**O., New Philadelphia**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

★**O., Portsmouth**—AIRPORT—City, grading, paving, lighting airport. $955,000. CAA will help finance.

★**O., Sandusky**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

★**O., Steubenville**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

O., Tiltonville—AIRPORT—City, grading airport. $25,000. CAA will help finance.

★**O., Toledo**—AIRPORTS—City, grading, paving, lighting airports, $1,390,000; grading, paving, lighting airport, $304,000; grading, paving, lighting airport, $304,000; grading, paving, lighting airport, $365,000. CAA will help finance.

★**O., Washington Courthouse**—AIRPORT—City, grading, paving, lighting airport. $730,000. CAA will help finance.

★**Okla., Ada**—AIRPORT—City, grading, paving, lighting airport. $199,925. CAA will help finance.

★**Okla., Alva**—AIRPORT—City, grading, paving, lighting airport. $732,270. CAA will help finance.

★**Okla., Anadarko**—AIRPORT—City, grading, paving, lighting airport. $657,880. CAA will help finance. CD 10/5—ENR 10/19.

★**Okla., Ardmore**—AIRPORTS—City, grading, paving, lighting airport, $137,150; grading, paving, lighting airport, $1,168,460. CAA will help finance.

★**Okla., Bartlesville** — AIRPORT — City, grading, paving, lighting airport. $872,454. CAA will help finance.

★**Okla., Blackwell**—AIRPORT—City, grading, paving, lighting airport. $854,744. CAA will help finance.

★**Okla., Chickasha** — AIRPORT — City, grading, paving, lighting airport, $818,780; grading, paving, lighting airport, $82,970. CAA will help finance.

★**Okla., Clinton**—AIRPORT—City, grading, paving, lighting airport. $1,042,980. CAA will help finance.

★**Okla., Cushing**—AIRPORT—City, grading, paving airport. $500,050. CAA will help finance.

★**Okla., Duncan**—AIRPORT—City, grading, paving, lighting airport. $868,400; grading airport, $44,440. CAA will help finance.

★**Okla., El Reno**—AIRPORT—City, grading, paving, lighting airport. $865,000. CAA will help finance.

★**Okla., Elk City**—AIRPORT—City, grading, paving, lighting airport. $729,650. CAA will help finance.

★**Okla., Guthrie**—AIRPORT—City, grading, paving, lighting airport. $950,520. CAA will help finance.

★**Okla., Guymon**—AIRPORT—City, grading, paving, lighting airport. $584,694. CAA will help finance.

★**Okla., Hugo**—AIRPORT—City, grading, paving, lighting airport. $594,009. CAA will help finance.

★**Okla., Idabell**—AIRPORT—City, grading, paving, lighting airport. $750,491. CAA will help finance.

★**Okla., Lawton**—AIRPORT—City, grading, paving, lighting airport. $979,506. CAA will help finance.

★**Okla., McAlester**—AIRPORT—City, grading, paving, lighting airport. $1,144,900. CAA will help finance.

★**Okla., Mangum**—AIRPORT—City, grading, paving, lighting airport. $720,850. CAA will help finance.

★**Okla., Miami-Commerce** — AIRPORT — Cities, grading, paving, lighting airport. $1,017,830. CAA will help finance.

★**Okla., Muskogee**—AIRPORT—City, grading, paving, lighting airport. $800,300. CAA will help finance.

★**Okla., Oklahoma City**—AIRPORT—City, grading, paving, lighting airport, $141,295; grading, paving, lighting airport, $164,900; grading, lighting airport, $112,470; grading, paving, lighting airport, $737,300; CAA will help finance.

★**Okla., Pawhaska** — AIRPORT — City, grading, paving, lighting airport. $921,800. CAA will help finance.

★**Okla., Ponca City**—AIRPORT—City, grading, paving, lighting airport. $1,026,157. CAA will help finance.

★**Okla., Seminole**—AIRPORT—City, grading, paving, lighting airport. $839,091. CAA will help finance.

★**Okla., Tulsa**—AIRPORTS—City, grading, paving, lighting airport, $180,680; grading, paving, lighting airport, $197,650; grading, paving, lighting airport, $967,395; grading, paving, lighting airport, $114,380. CAA will help finance.

★**Okla., Vinita**—AIRPORT—City, grading, paving, lighting airport. $702,108. CAA will help finance.

★**Pa., Aliquippa**—AIRPORT—City, grading, paving, lighting airport. $495,000. CAA will help finance.

★**Pa., Butler**—AIRPORT—City, grading, paving, lighting airport. $880,000. CAA will help finance.

★**Pa., Contesville**—AIRPORT—City, grading, paving, lighting airport. $1,000,000. CAA will help finance.

Pa., Emporium—AIRPORT—City, grading, lighting airport. $58,000. CAA will help finance.

★**Pa., Hazelton**—AIRPORT—City, grading, paving, lighting airport. $865,000. CAA will help finance.

★**Pa., New Kensington**—AIRPORT—City, grading, paving, lighting airport. $1,650,000. CAA will help finance.

★**Pa., Pittsburgh**—AIRPORTS—City, grading, lighting airport $87,000, grading, lighting airport $82,000, grading, lighting airport $79,000, grading, paving, lighting airport $533,000, grading, lighting airport $87,000, grading, paving, lighting airport $583,000, grading, lighting airport $77,000, grading, lighting airport $82,000, grading, paving, lighting airport $373,000, grading, paving, lighting airport $510,000. CAA will help finance.

★**Pa., Pottsville**—AIRPORT—City, grading, paving lighting airport. $1,020,000. CAA will help finance.

★**Pa., Somerset**—AIRPORT—City, grading, paving, lighting airport. $1,000,000. CAA will help finance.

★**Pa., Sunbury**—AIRPORT—City, grading, paving, lighting airport. $890,000. CAA will help finance.

★**Pa., Wilkes Barre**—AIRPORTS—City, grading, paving, lighting airport $463,000, grading, lighting airport $87,000, grading, lighting airport $87,000, grading, paving, lighting airport $2,710,000, grading, paving, lighting airport $405,000. CAA will help finance.

★**R. I., Bristol**—AIRPORT—City, grading, paving, lighting airport. $534,000. CAA will help finance.

★**S. C., Greenville-Spartanburg**—AIRPORT—Cities, grading, paving, lighting airport. $1,243,000. CAA will help finance.

★**S. C., Laurens**—AIRPORT—City, grading, paving, lighting airport. $740,000. CAA will help finance.

★**S. C., Marion-Mullins**—AIRPORT—Cities, grading, paving, lighting airport. $460,000. CAA will help finance.

★**S. C., Newberry**—AIRPORT—City, grading, paving, lighting airport. $620,000. CAA will help finance.

★**S. C., Orangeburg** — AIRPORT — City, grading, paving, lighting airport. $530,000. CAA will help finance.

★**S. D., Huron**—AIRPORT—City, grading, paving, lighting airport. $780,000. CAA will help finance.

Tex., Laredo—AUTOMATIC FIRE ALARM—City, plans automatic fire alarm. $50,000.

Washington—ELECTRIC LINES—Public Utility Dist., Republic, plans 110 mi. rural electric lines, Ferry Co. $100,000.

PLANS UNDER WAY

Calif., Burbank—PARKS, etc.—City, City Hall, 275 E. Olive Ave., plans 25% completed parks, playgrounds, swimming pool, and landscaping. $400,000. Financing not provided. H. R. Bennett, City Hall, city engr.

★**Calif., Los Angeles** — AIRPORT — City, City Hall, plans airport, vicinity of Lelmert Park Dist., $70,000; runways, taxiways, administration bldg., at municipal airport, near Inglewood, $20,000,000, incl. land; imprv., developing Downtown Airport in Elysian Park, incl. runways, freeways, tunnels, roadways, terminal, appurtenant bldgs., $18,004,000. M. T. Tucker, City Hall, airport engr. CD 9/7—ENR 9/21.

Mich., Escanaba—AIRPORT—City, plans under way grading, paving, runways, lighting airport. $305,000. Froth, Boyd & Porath, Columbus Bldg., Green Bay, Wis., consult. engrs. A. V. Aronson, Escanaba, city engr. CD 1/4.

Mich., Monroe—ATHLETIC FIELD—Monroe Bd. Educ., plans 1% completed by R. M. Dunbar, Monroe, 2 athletic fields, concrete bleachers, locker rooms, etc. $120,000.

Minn., Montevideo—AIRPORT—City, grading, paving, lighting airport. $304,000. CAA will help finance. Ellerbe & Co., 1021 First Natl. Bank Bldg., St. Paul, engrs. CD 2/24—ENR 3/9.

POSTWAR PROJECTS (Cont'd.)

Miss., Jackson—PARK—City, City Hall, plans 10% completed developing 490 acre site, driveways, lake, swimming pool, community bldg., playgrounds, golf course. $200,000. Financing not provided. J. J. Halbert, city engr.

Mo., Farmington—AIRPORT—City, grading, lighting airport. $114,500. CAA will help finance. B. F. Walther, city engr. CD 8/2—ENR 8/24.

Mo., Kansas City—OPERA STAGE—City Park Bd., J. V. Lewis, supt., City Hall, preliminary plans completed by E. B. Delk, 11 West Concord St., municipal opera stage at Swope Park. $300,000.

N. Y., Jamestown — AIRPORT — City, grading, paving, lighting airport. $1,000,000. CAA will help finance. C. J. Strandburg, City Hall, engr. CD 5/24—ENR 6/1.

O., Youngstown—AIRPORT—City, grading, paving, lighting airport. $320,000. CAA will help finance. R. W. O'Neill, city engr. CD 9/9/43—ENR 9/16/43.

Tex., Kansas and Missouri—PIPELINE —Phillips Petroleum Co., Bartlesville, Okla., plans 1% completed 16 in. natural gas pipeline carrier from Hugoton area, Tex., to Wichita, Kan. and Kansas City, Mo. areas. $10,000,000.

Tex., Dallas—PARK—City plans 25% completed landscaping, fencing, athletic courts, hardsurfacing playgrounds, grading, drainage Lagow Park. $66,000. Financing provided. Hare & Hare, 114 W. 10 St., Kansas City, Mo. consult. engrs.

Tex., Dallas—PARKS—City, plans 25% completed athletic field, community center, recreation facilities, Sullivan Park, $60,000; plans 1% completed athletic courts, ground development, swimming pool, Fair Park, $100,000. Will vote bond issue. Hare & Hare, City Hall, consult. engrs. D. Bartholomew, 317 N. 11 St., St. Louis, Mo., city planner.

Tex., Galveston—PARK, etc.—City of Galveston and Galveston Co., plans park and playgrounds. $1,034,725. Financing not provided. C. C. Washington, Court House, co. engr.

Tex., Marshall—RADIO STATION—Marshall Broadcasting Co., Marshall, plans 25% completed fireproof broadcasting station. $40,000.

Tex., San Antonio — AIRPORT — City, plans grading, leveling, drainage, hard paving outside area and street lighting airport. $1,352,267. T. Coghill, City Hall, engr.

Tex., Weslaco—AIRPORT—Town, grading, training, hangars, shops, runways. $205,000. K. Waters, Weslaco, consult. archt.

READY FOR BIDS

Calif., Burbank—ELECTRIC DISTRIBUTION SYSTEM—City, City Hall, 275 E. Olive St., plans completed electric distr. sys. $720,800. Financing provided. H. R. Bennett, City Hall, city engr.

Fla., Jacksonville — AIRPORT — City, plans completed addnl. runways, $1,000,000; hangars $400,000; grading $200,000, freight docks $193,000; administration bldg. imprvs, addns., $125,000, all foregoing at Municipal Airport No. 1; constructing new exten. old runways, $2,200,000; grading Beach Rd., $750,000; addnl. drainage facilities $450,000; grading, paving, $285,000; hangars, $200,000; electric substation and standby unit, $27,596; exten. electric sys., $150,000; enlarging, imprv. administration bldg., $150,000; sewage addns., $110,000; water supply imprvs. $35,000, all foregoing at Municipal Airport No. 2. Financing provided. W. E. Sheddon, Engineers Bldg., city engr.

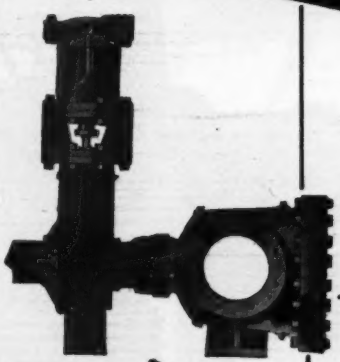
Fla., Jacksonville—PARKS, etc.—City, plans completed landscaping $150,000, swimming pool, $75,000, baseball park, $100,000, administration bldg. $25,000, all for Recreation Dpt. Financing available. W. E. Shedden, Engineers Bldg., city engr.

Fla., Jacksonville—PARKS—City, plans completed imprv. Brentwood Park $46,247, Jacksawanna and Riverside Parks $29,875, Stone Park $65,000, community house and imprv. Murry Hill Play Grounds, $44,759, grandstand for Recreation Dpt. $125,280, recreation bldgs., etc., $134,600. Financing available. W. E. Shedden, Engineers Bldg., city engr.

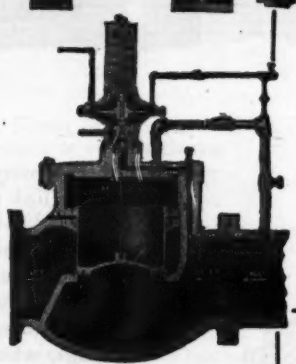
Fla., Jacksonville—PIER—City, plans completed Pier 4, $224,100; general repairs and imprvs. Piers 1 and 2, $500,000; warehouse at Pier 4, $261,800; repairing imprvs Pier 2 and expanding equipment storage, $26,850; roofs on Warehouses 1 and 2, at municipal docks, $42,200; floors and providing cargo pallets, same warehouses, $65,740; concrete runways, repairing warehouse 3, $75,076; Naval Stores and storage improvements, $42,800; restaurant bldg., etc., $5,000. Financing provided. W. E. Shedden, Engineers Bldg., city engr.

Tex., Dallas — AIRPORT — City, plans completed 2 hard paved and 1 sodded runway, taxiways, 2 hangars, administration bldg., roads, lighting, drainage and grading Red Bird Airport. $1,200,000. Financing available. Rollins & Forest, Praetorian Bldg., consult. engrs. CD 9/25—ENR 10/19.

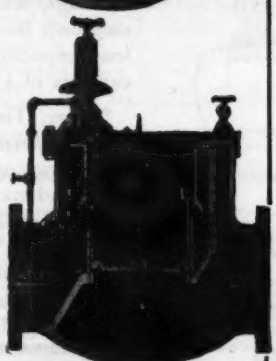
Where Water Control is Vital— Specify GOLDEN-ANDERSON



Assure a full line opening without pressure drop on automatic services with the G-A CONE THRU-FLOW VALVE. In lieu of gate valves these can be supplied for manual operation. These units are designed for most automatic services such as altitude, check, relief, etc. Four inch to seventy-two inch sizes are available.



Equip your tanks and standpipes with G-A ALTITUDE CONTROL VALVES . . . get a constant automatic water level control that you can rely on! There's no danger of overflow with this valve and it is cushioned against water hammer. These valves are supplied in two inch to thirty-six inch size, in globe or angle pattern with full bronze trim.



This G-A WATER PRESSURE REDUCING VALVE features a perfectly balanced pilot control, capable of meeting any flow demands. Air and water cushioning assures feather touch operation. These valves are furnished in sizes from 3 inches to 36 inches in materials to meet your specific requirements.

Make GOLDEN - ANDERSON your choice regardless of the type of water service. This line is *complete* . . . and offers a size and type valve to meet any operating requirements. Latest catalogs will be sent at your request.

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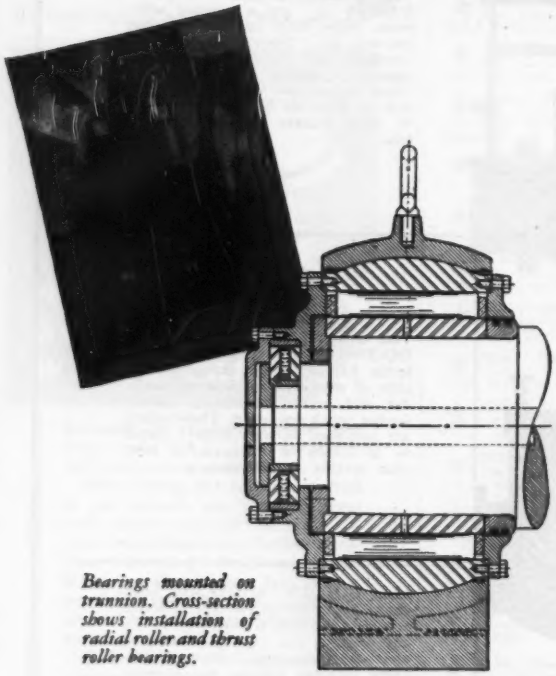

Bearings mounted on trunnion. Cross-section shows installation of radial roller and thrust roller bearings.

The Lewiston-Clarkston Bridge spans the Snake River to link the states of Washington and Idaho. Completed in October 1939, the bridge consists, in part, of a vertical lift span that measures 200 feet, with a total weight of 1,428,800 pounds. Each of the four lift-sheaves employs two Torrington Radial Roller Bearings and a Thrust Roller Bearing. The bearings, which were designed and built by Torrington's Bantam Bearings Division, have a radial load capacity of 1,429,000 pounds; a thrust load capacity of 170,000 pounds at 5 R.P.M.

Today, Torrington Bearings are delivering the peak performance that results in smooth, dependable, low-cost operation, in bridges, dams, lockgates and many other types of engineering projects. Avail yourself of Torrington's diversified experience in designing bearings for special applications whenever you have either a standard or an unusual antifriction problem.

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ELSIE EAVES, Manager *SCOTT McLEOD, Statistics* *J. A. MAHONEY, Reports*

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WATER SUPPLY

PROPOSED WORK

★**Md., Baltimore**—City, Bd. Awards, City Hall, rejected bids Dec. 21, Liberty Rd.-Montebello Tunnel. (Patapsco Development). Will readvertise. L. Small, Dpt. P. Wks., Bureau Water Supply, water engr. L. L. Smith, ch. engr. CD 12/27—ENR 1/4, under LB.

Mich., Negaunee—City, J. H. Anderson, mgr., preparing plans water filtration plant, 200,000 to 300,000 gal. per day capacity. Approx. $75,000. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

Tex., Dallas—City, bids soon c.i. water mains. $70,000.

Tex., Dallas—C. S. Dawley & Associates, 1734 Potomac St., laying c.i. mains in Vickery to connect with city mains. $20,000.

Tex., Houston—Harris County Water Control & Imprv. Dist. 3, 126,000 -gal. steel ground storage type reservoir for Water Plant 2. Over $15,000. Hays & Donothan, 940 Main St., engrs.

N. S., Berwick—Municipality, E. S. Illsley, mayor, water sys. $39,000.

Ont., Wallaceburg—Utilities Comn., W. Glendinning chn., preparing plans water-main extens. $25,000-$30,000. W. Colby, Town Hall, engr.

Que., Kenogami—Municipality, water sys. extens. $55,000. Lavoie & Delisle, Chicoutimi, engrs.

Que., La Salle—Municipality, watermains, St. Patrick St., etc. $25,000.

BIDS ASKED

Bids Asked February 6

La., Hahnville—St. Charles Parish School Bd., Hahnville, water supply and purification sys., Div. 1, water treatment plant, tanks and special purification equip., Div. 2, general constr. work. Plans deposit $10. Thourds, Mogabgab & Bean, Audubon Bldg., New Orleans, archts.

Bids Asked February 9

†**Md., Hyattsville**—Washington Suburban Sanitary Comn., Hamilton St., approx. 6,490 ft. 6- to 24-in. c.i. watermains, Contr. 181-W. Plans deposit $5. H. R. Hall, ch. engr.; adv. ENR 1/25.

Neb., Crawford—City, WW imprvs., incl. reservoir and mains, Neb. 25-157-N. $138,-000. FWA. R. Fulton, 2327 S. 19 St., Lincoln, engr. CD 12/27—ENR 1/4.

LOW BIDDERS

†**Tex., Bay City**—City, c/o S. E. Doughtie, mayor, City Hall, Jan. 11, Contr. 2, WW imprvs. incl. water distr. sys. addns., extens. 250,000 gal. concrete ground storage reservoir, high service pump. facilities, etc., Tex. 21-702-N, from G. Mora, 312 Sabine St., Houston, $92,448. FWA. CD 12/28—ENR 1/4.

†**Wash., Longview**—City, M. H. Labsap, water supt., 1544 Commerce Ave., Jan. 16, 4,300 ft. 12 and 16 in. asbestos cement pipeline, Wash. 45-316-N, from M. Malaspina, 1901 21 Ave. S., $30,827. FWA. CD 1/4—ENR 11/9.

Wash., Seattle—City, Bd. P. Wks., County-City Bldg., 5 and James Sts., Zone 4, Jan. 18, reservoir in Magnolia Dist., from La Coluccio, 311 21 Ave., $61,130. Est. $62,192. C. L. Wartelle, City Hall, city engr. CD 1/11.

CONTRACTS AWARDED

Calif., Tracy—City, City Hall, watermain extens. in Parker Acres, to J. Pestana, 4039 Fruitvale Ave., Oakland, $20,501. J. S. Bates, 3134 Eton Ave., Berkeley, engr. CD 11/17—ENR 11/23.

D. C., Wash.—District Comrs., District Bldg., 24 in. trunk watermain, Alabama and Boulevard Aves., to John Matricciani & Sons, 339 S. Exeter St., Baltimore, Md., $39,544. Bids 12/14.

†**Fla., Jacksonville**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., water treatment plant, Naval Air Station, NOY 10733, to Bass Engineering & Const. Co., 215 Birmingham Theatre Bldg., Birmingham, Mich. Est. $45,000.

Alta., Lethbridge—Municipality, 1¼ mi. 16 and 18 in. watermains, day labor. $160,000. J. Haines, City Hall, engr. CD 12/29—ENR 1/4.

Que., St. Sauveur des Monts—Municipality, c/o A. Belanger, clk., St. Sauveur des Monts, WW imprvs., to W. H. Kelly, 1424 W. Ste. Catherine St., Montreal. Est. $15,000. CD 12/29—ENR 12/14.

Symbols and Abbreviations Include:

†	Federal Government
★	Project of $500,000 or over
ENR	Engineering News-Record
CD	Engineering New-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads): BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

★**Que., Montreal**—City, J. A. Mongeau, clk., gallery of addnl. filters, adjacent to filtration plant, Joseph St., to Atlas Const. Co., Ltd., 679 Belmont St., Montreal. $1,489,965. C. J. Desbaillets, c/o City, engr. CD 1/17, under LB—ENR 9/14.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

★**Calif., Los Angeles**—Los Angeles County Sanitation Dist. 16, 110 S. Bway., plans 21 sq. mi. sanitary sewer facilities, San Gabriel Valley. $1,473,000. A. M. Rawn, 110 S. Bway., engr.

O., Columbus—C. P. Lauderbaugh, chn. Comrs. Franklin Co., Court House, sewerage extens. from city limits to site of proposed General Motors Corp. plant on Georgesville Rd., between Broad St. and Sullivant Ave.

O., Yellow Springs — Village, installing 15- to 36-in. storm sewer lines, various parts of village. $60,000. R. T. Parish, U.B. Bldg., Dayton, engr.

★**Pa., Greensburg**—City, H. S. Coshey, mayor, Greensburg, sewage treatment plant, intercepting sewers, Hempfield Twp. $700,000. H. W. Wentzell, City Hall, engr. Survey by The Chester Engineers, 210 E. Parkway, Pittsburgh, Zone 12.

Pa., Morrisville—Dpt. P. Wks., Boro Hall, sewerage sys., disposal plant. Albright & Friel, Inc., 1520 Locust St., Phila., Pa., engrs.

Pa., Somerset—Boro, G. W. Schenck, chn. Sewer Comn., Somerset, secondary sewage treatment plant and outfall sewer. $150,000. Whitman Requardt & Assoc., 1304 St. Paul St., Baltimore, Md., engrs.

Tex., Dallas—City, bids soon sewer imprvs., pump. unit, etc. $40,000.

N. S., Berwick—Municipality, E. S. Illsley, mayor, sewerage sys. $45,000.

Ont., Simcoe—Municipality, exten. storm sewers. $35,000.

Que., Kenogami — Municipality, sewers. $35,000. Lavoie & Delisle, Chicoutimi, engrs.

BIDS ASKED

Bids Asked January 29

†**Va., Hilton Village (br. Newport News)**—Bd. Supervs. Warwick Co. at office of County Manager, Hilton Village, Contr. 3, 2,599 lin. ft. sanitary drains, manholes, appurtenances, 44,480 lin. ft. pre-cast concrete block ditch liners, miscellaneous sanitary drainage facilities, Va. 44-398. FWA. Plans deposit $25. Massey & Johnson, Farr Bldg., Fairfax, and Box 488, Hilton Village, consult. engrs.

Bids Asked February 19

Ill., Urbana-Champaign — Bd. Trustees Urbana-Champaign Sanitary Dist., F. D. Murphy, pres., Administration Bldg. of Urbana and Champaign Sanitary Dist., east of Big Four Shops, Urbana, sewage treatment plant addns., incl. rectangular sedimentation and sludge digestion tanks, sludge pump. station, outside piping, measuring flumes, excav., etc. $70,000, incl. equip. Plans deposit $10. Greeley & Hansen, 6 N. Michigan Ave., Chicago, engrs. CD 12/4—ENR 12/7.

LOW BIDDERS

†**Calif., Hueneme**—Federal Works Agency, 1206 Santee St., Los Angeles, Jan. 12, 8- to 18-in. vitr. clay sanitary sewers, from R. A. Wattson Co., 5528 Vineland Ave., North Hollywood, $118,271; sewage treatment plant from Stroud-Seabrook, P. O. Box 97, Bakersfield, $85,670, both foregoing Calif. 4-660-F. CD 1/4—ENR 12/21.

†**Tex., Texas City**—E. A. Johnson, mayor, City Hall, Jan. 9, sewer imprvs., Tex. 41-696 N, from T. A. Newman Const. Co., Texas City, $96,733. FWA. CD 12/15—ENR 12/21.

CONTRACTS AWARDED

†**Calif., Sacramento**—U. S. Eng., 1209 8 St., Sacramento, Zone 8, industrial waste treatment plant, Sacramento Air Depot, Spec. 1018, to H. W. Robertson, 3004 F St., $44,948. CD 1/9—ENR 1/11, under McClellan Field, LB.

N. S., Halifax—Dpt. Natl. Defense (Sea) Ottawa, Ont., sewers and watermains at H.M.C. Dockyard, to Atlas Const. Co. Ltd., 679 Belmont St., Montreal, Que., $85,000. CD 5/24—ENR 6/8, under Water Supply.

BRIDGES

PROPOSED WORK

Ind., Anderson—City and Madison Co., rebuilding Delaware St. bridge, $35,000.

Wash., Bellingham—City, A. C. Howard, mayor, 3 rein.-con bridges over Whatcom Creek. $44,000.

Ont., Linwood—Wellesley Twp., J. Heinbuch, clk., Linwood, bridge. $35,000. J. D. Emery, Linwood, engr. CD 9/8—ENR 9/14.

LOW BIDDERS

California—State Div. Hys., Sacramento, Jan. 17, 10.5 mi. concrete bridge, approaches, Humboldt Co., from Mercer Fraser Co., 2 and Commercial Sts., Eureka, $181,325. CD 1/4.

Ill., Chicago—County Clerk, County Bldg., Jan. 8, removal, replacement temporary portion Burnham Ave. Viaduct superstructure, from Thomas McQueen Co., 1313 Circle Ave., Forest Park, $97,740; furnishing, erecting 1,134 road signs incl. wood posts, 907 road signs, no posts, furnishing 600 road signs, from Roy A. Brennan & Co., 3737 Bway., Evanston, $38,886. CD 12/27.

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STREETS AND ROADS

BIDS ASKED

Bids Asked January 31

N. Y., Staten Island—President Richmond Boro, Boro Hall, Zone 1, bituminous concrete repaving Forest Ave. from Union to South Aves.

Bids Asked February 6

La., Alexandria—H. T. Dulaney, city secy.-treas., City Hall, 6 in. rein.-con. paving St. Anne St. from Third to Seventh Sts.

Bids Asked February 7

New York—Dpt. P. Wks., Highway Div., Albany, constructing 6.34 mi. hy. RC-45-4, Albany Co., $186,339; 0.9 mi. SS-45-1, Nassau Co., $119,490; 6.31 mi. RC-45-1, Schenectady Co., $136,221.

Bids Asked February 14

La., Thibadaux—Police Jury of Lafourche, Chas. J. Conlon, secy., Thibadaux, furnishing, del. and spot dumping approx. 5,421 yd. shells and approx. 2,600 yd. washed gravel, in Wards 1 to 10, Lafourche Parish.

Bids Asked April 1

Ont., London—Middlesex Co. Council, W. A. Sutherland, clk., black top resurfacing, $28,000. W. Raywood Smith, County Bldgs., engr.

Bids Asked

Kentucky—At office Dpt. Hys., Frankfort, rejected bids Jan. 5, imprv. 0.416 mi. Maysville-Paris Hy., SP 31-175, Mason Co. CD 12/19—ENR 12/21.

LOW BIDDERS

Calif., Los Angeles—Los Angeles Co., Hall of Records, Jan. 9, imprv. Century Blvd., Contr. 530, from Harvey Adair Constr. Co., 1147 E. Harvey Ave., El Monte, $61,883. CD 12/19—ENR 12/21.

North Dakota—State Hy. Dpt., Bismarck, Jan. 12, imprv. 0.818 mi. and 0.845 mi. Grant Co., from Megarry Bros., St. Cloud, Minn., $29,012 and $37,775 respectively; 0.265 mi., Grant Co., and 0.738 mi. Morton Co., from Rue Constr. Co., Bismarck, $27,197 and $46,738 respectively. CD 1/4.

Texas—State Hy. Comn., B. P. Gentry, chn., Jan. 15, grading, curbing, guttering, flex base and hot mix asphaltic concrete paving 1.004 mi. U. S. Hys. 87 and 287 SN. FAP. 1069-A(1), from south city limits to north city limits of Dumas, Moore Co., from Bell & Braden, Amarillo, $69,814.

CONTRACTS AWARDED

Maryland—State Roads Comn., Baltimore, imprv. 4 mi. Prince George's Co., to Eastern Highways Corp., Belle Grove Rd., Brooklyn, $24,664. Bids 1/9. CD 1/2—ENR 1/4.

Ont., London—Middlesex Co. Council, W. A. Sutherland, clk., maintenance road work, own forces, $175,000. W. Raywood Smith, County Bldg., engr.

Ont., Strathroy — Municipality, A. MacKinlay, reeve, road repairs and new construction, day labor. $35,000.

Saskatchewan—Province of Saskatchewan, Regina, 43 mi. road from Prince Albert to Lac in Ronge, day labor. $60,000.

EARTHWORK, WATERWAYS

PROPOSED WORK

†Conn., Stonington—U. S. Eng., 319 Industrial Trust Bldg., Providence, R. I., preliminary plans reconstructing East Breakwater.

N. J., Cape May—City, City Hall, reconstructing stone, concrete jetties and bulkheads, creosote groins, $300,000. L. E. Miller, City Hall, engr.

Ore., La Grande—City, E. H. Ford, mgr., raising Beaver Creek dam by 10 ft. increasing water supply. $25,000.

Tex., Corpus Christi—City, A. C. McCaughan, mayor, City Hall, drainage for 5 acre area, asphalt paving Lipan St. $100,000.

BIDS ASKED

Bids Asked About February 1

Kan., Coffeyville—J. D. Byers, mayor, City Hall, levee construction on Verdigris River, east side of city. J. G. Dyckworth, City Hall, city engr. CD 11/22—ENR 11/30.

Bids Asked February 5

†Idaho—Bureau Reclamation, Dpt. Interior, Denver, Colo., furnishing, del. f.o.b. cars at shipping point or f.o.b. cars at Coeur d'Alene, one welded plate-steel discharge pipe, 2 welded plate steel suction pipes, one welded plate-steel outlet connection, 8 steel tie rods, 14 steel anchor bolts for suction and discharge lines, temporary Pump. Plant B, Post Falls Unit, Rathdrum Prairie Project, Spec. 1791-D.

Bids Asked February 8

Louisiana—Orleans Levee Dist. Comn., 200 Civil Courts Bldg., New Orleans, 2,700 ft.

EARTHWORK, WATERWAYS (Bids Asked. Cont'd.)

levee revetment on west bank of Mississippi River, Orleans Parish. Plans deposit $10. A. L. Willox, Civil Courts Bldg., New Orleans, engr.

Bids Asked February 9

†**Louisiana**—U. S. Eng., foot Prytania St., New Orleans, dredging approx. 4,240,000 cu. yd. earthwork and performing other incidental work on 9 x 100 ft. Vermillion River Project, Solic. No. 16-047-45-79, Vermillion Parish.

Bids Asked February 14

†**Calif., Coachella** — Bureau Reclamation, Dpt. Interior, W. H. Naider, acting ch. engr., Denver, Colo., 50,000 gal. elevated steel water tank, Coachella Canal, Government Camp near here, Riverside Co., All-American Canal Sys., Boulder Canyon project, Arizona-California-Nevada. Spec. 1790-D.

LOW BIDDERS

Calif., Long Beach—City, City Hall, Jan. 15, furnishing material, cleaning, filling, rolling and grading certain area in Long Beach near Cherry Ave. and Artesia St., 22,000 cu. yd. fill. Spec. C-645, from La. S. Hutchinson Co., 1304 E. Seventh St., Los Angeles, $14,960. G. E. Baker, City Hall, engr.

†**Ore., Klamath Falls**—Dpt. Interior, Bureau Reclamation, H. W. Bashore, comr., Klamath Falls, Jan. 16, constructing Pump. Plants E and F, and earthwork and structures for Klamath Straits drain outlet, Modoc unit, Klamath Project, Tule Lake Div. Klamath Project, Oregon-California, 12 mi. south of here, Spec. 1088, from Tru-Mix Concrete Co., 805 Market St., $151,132. CD 12/12—ENR 12/14.

CONTRACTS AWARDED

†**Illinois**—U. S. Eng., $16 U. S. Courthouse & Customhouse, St. Louis, Zone 1, Mo., repairing approx. 27,700 lin. ft. eroded levees and placing about 15,000 cu. yd. earth repairs in Cass and Morgan Counties, to E. Luhr, Columbia, $16,202. Bids 12/19.

Tex., Port Lavaca—Victoria-Calhoun Soil Conservation Dist., Port Lavaca, dredging, terracing, revetment, ditching, etc., for soil conservation project, own forces, approx. $80,000. CD 8/23—ENR 8/31.

LATIN AMERICA

Brazil, Bahia—State of Bahia, plans sewerage sys. $2,000,000.

Brazil, Sao Paulo—Alvim & Cia, Ltda., Rua Quintino Bocaiuva, 175, Sao Paulo, plans general woodworking plant and particularly for manufacture of dolls, etc. $50,000.

Brazil, Sao Paulo—Companhia Brasileira de Material Ferrovario, Sao Paulo, plans railway material mfg. plant.

B. W. I., Port of Spain—Trinidad Government, Port of Spain, plans by W. H. Watkins & Partners, Port of Spain, 2 story, bamnt., concrete sanitorium, nurses home. $1,000,000.

Chile, Santiago—Republic of Chile, Santiago, plans constructing over period of 5 years, railroad, from Salte to Antofagasta, Tres Puentes to Los Loros, Longotoms to Los Vilas, and constructing railway stations at Tungay and Sunoa and imprv. station at Mapocho. $6,000,000. Dpt. P. Wks., Santiago, engr.

Guatemala, Guatemala City—Municipality, plans concrete, brick housing. $350,000.

Mexico—Secretary of Communicacions, Maximino Avila Camacho, dir., Tacuba St., Mexico City, plans approx. 250 mi. railroad between Mexico City and Port of Acapulco. $7,500,000.

Mexico—State of Campeche, Governor Eduardo J. Lavalle Urbina, Campeche, will construct roads, waterworks, sewage and irrigation projects, statewide, by own forces. $600,000.

Mexico, Arriaga—State of Chiapas, Angel Dubon, head of educational com., Tuxtla Gutierrez, taking bids modern school housing 700 students, gym playgrounds. $150,000.

Mexico, Chihuahua City—Community Group headed by Fernando Foglio Miramontes, Chihuahua, takes bids probably in 60 to 90 days, packing and refrigeration plant. $1,000,000.

Mexico, Cuernavaca—Hotel Cortes, S. A., Ralph Elguero, c/o Bella Vista Hotel, Cuernavaca, takes bids within 30 days resort hotel, $1,000,000.

Mexico, Guachochii—State of Chihuahua, Governor Alfredo Chaves, Chihuahua, plans constructing entire town for indians of Chihuahua, incl. streets, water, sewage, bldgs., schools, near here. $1,000,000.

Mexico, Guadalajara—State of Jalisco, Governor Marcelino Garcia Barragan, Guadalajara, plans drainage sys. $1,000,000.

Mexico, Guadalajaha—State Government, Gen. Marcelino Garcia Barragan, gov., Palacio del Estado, Guadalajara, plans water and drainage works. $1,150,000.

Mexico, Leon—Cementos Portland del Bajio, pres. Jose Rivera R., Leon, taking bids constructing cement plant, 150,000 tons yearly capacity. $2,500,000. E. S. Tillotson, Leon, engr.

Mexico, Mexicali—City of Mexicali, repairing, etc. avenues Obregon, Juarez and Reforma and streets Melgar, Azuela, Altamirano and Morales, to S. Geering, Mexicali. Est. $100,000.

Mexico, Mexico City—Artemetalica, S. A. Gustavo, Liceaga, mgr., Ave. Fernando, 206 Col. Alamos, Mexico, D.F., plans metal plant. $100,000.

Mexico, Mexico City—Celanese Mexicana, S.A., Mexico City, plans industrial bldgs. $4,000,000.

Mexico, Mexico City—Department Civil Aeronautics, General Alfredo Lezamo, chf., Tacuba St., plans amplifying central airport, new runways, paving, enlarging field. $1,400,000.

Mexico, Mexico City—Distribuidora Mexicana, S.A., Mexico City, Bolivar 35, will take bids in March, constructing factory bldgs. $720,000.

Mexico, Mexico City—Fabrica de Oxidos de Zin, La Azteca S. A. Prolongacion de la Candelaria, 66 Mexico, D.F., plans plant. $100,000.

Mexico, Mexico City—Federal Dist., Central Dpt., Rono Gomez, mayor, Monada and Palacio National Sts., plans 5 supermarkets. $500,000.

Mexico, Mexico City—Flechas y Acero, S. A., 20 de Noviembre St., 53-506, Mexico, D.F., plans steel plant. $100,000.

Mexico, Mexico City—Industrial Marineda, S. A., Gante, 4-502-503, Mexico, plans plant. $100,000.

Mexico, Mexico City—Industrias Unidas, S. A. Sidar y Rovirosa, 30, Mexico, D.F., plans lamp plant. $100,000.

Mexico, Mexico City—Mecanica y Metalurgica Industrial, S.A., Serapio, Rendon, 112 Mexico, D.F., plans gear plant. $125,000.

Mexico, Mexico City—Productos Quimicos Glyco, S.A., Cipres, 355 Mexico, D.F., plans chemical plant. $150,000.

Mexico, Mexico City—Salico S. A. Balderas, 31-613 Mexico, D. F., plans chemical plant. $100,000.

Mexico, Mexico City—Sugar Workers Syndicate, Angel I. Rodriguez, head executive com., Mexico City, takes bids in March office bldg., La Palma and Republica de Cuba Sts. $350,000.

Mexico, Mexico City—J. Rotenberg, Calzada de Tlalpan, 1633, Mexico, D. F., plans plant. $100,000.

Mexico, Monclavo—Municipal Govt., Palacio Municipal, Monelavo, plans water and drainage works. $210,000.

Mexico, Montemorelos—State of Nuevo Leon, Governor Arturo de la Garza, Monterrey, takes bids early in 1945, constructing dehydrating plant to process production of oranges. $100,000.

Mexico, Monterrey—Fabricacion de Mquinas, S.A., Edificio Isaac Garza, office 701, Monterrey, plans machinery plant. $150,000.

Mexico, San Bartolo Naucalpan—State, Governor Isidro Fabela, Toluca, takes bids within 60 days, school, playgrounds, etc. $150,000.

Mexico, Sayula Region—State of Jalisco, Governor Marceline Garcia Barragan, Guadalajara, takes bids within 90 days, constructing irrigation projects to get water for Sayula, Ciudad Guzman and Tamazula. $500,000.

Mexico, Tacubaya—Industrias Ganem, S.A. Civilizacion, 81, Tacubaya, D.F., plans lamp plant. $100,000.

Mexico, Tampico—Secreteria de Marina, Heriberto Jara, Calle Mariam Azueta 9, Mexico City, plans series of modern docks for port. $3,500,000.

Mexico, Tehuantepec Isthmus — Mexican Government, Scrita. de C. y O. P., Mexico, D. F., plans bridge. $615,000. Gonzalo Gomez de la Mata, Scrita. de C. Y. O. P. Mexico, D. F., engr. CD 1/10—ENR 1/18.

Mexico, Tianepantla—Asbestos S.A., Pres. Emilio Lanzagorta, Mexico City, will take bids within 90 days constructing asbestos mfg. plant. $350,000.

Mexico, Torreon—National Railways of Mexico, E. Rodriguez y Parra, engr. M.W., 19 Bolivar St., Mexico City, will construct terminal station and roundhouse, by own forces. $250,000.

Mexico, Villahermosa—State of Tabasco, Villahermosa, plans electrical plant serving Villahermosa and surrounding towns. $125,000.

Panama, Panama City—Municipality, plans 104 three room, 45 four room apartments, 7 stores, all rein.-con. $460,000.

Peru, Lima—Abelardo Noriega del Valle, Lima, plans penicillin mfg. plant exten. $100,000.

Peru, Lima—Banco Wiese, Calla Filipinas, Lima, plans 8 story bank and office bldg. on 1,300 sq. meter site. 2,500,000 Soles.

Peru, Oyon—Mining Bank, Lima, plans coke mfg. plant, exten., in Province of Cagatambo. 1,000,000 Soles.

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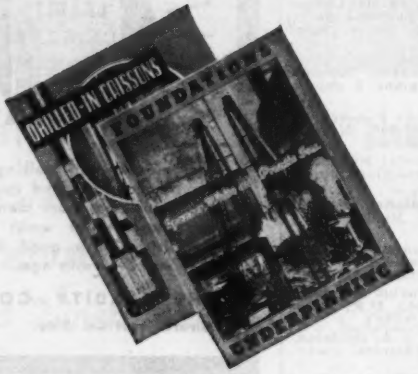

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LATIN AMERICA (Cont'd.)

Peru, Puerto Maldonado—Republic of Peru, Lima, plans branch railroad from mouth of Sepahua River to River Madre de Dios opposite Puerto Maldonado. $1,000,000

Venezuela, Bolivar City—Municipality, plans sewers. 2,500,000 Bolivars.

Venezuela, Caracas — Municipality, plans sewers near Rio Guaire. 8,000,000 Bolivars

Venezuela, Caracas—Republic of Venezuela, Caracas, plans exten. maternity home, Concepcion Palacios. $200,000. Dpt. P. Wks., Caracas, engr.

Venezuela, Caracas—Republic of Venezuela, plans by Dpt. P. Wks., Caracas, National Archives Bldg. 1,800,000 Bolivars.

Venezuela, Caracas—Republic of Venezuela, Caracas, plans military academy, 10,000,000 Bolivars; lyceum for 1,000 students on corner (esquina) of de Solis. 4,500,000 Bolivars; normal school, 3,000,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, Caracas—Republic of Venezuela, Caracas, plans exten. Palacio de Miraflores, 1,500,000 Bolivars; market bldg. 800,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, Carupano — Municipality, plans sewers. 300,000 Bolivars.

Venezuela, Colon — Municipality, plans sewers. 551,050 Bolivars.

Venezuela, Cuama—Municipality, Cuama, plans city hall. $200,000.

Venezuela, Cumana — Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, anti-tuberculosis sanitorium. 2,000,000 Bolivars.

Venezuela, Cumana — Republic of Venezuela, Caracas, plans bridge over River Manzanares, 250,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, El Tocuyo — Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, reconstructing La Iglesia de La Concepcion.

Venezuela, El Tocuyo — Republic of Venezuela, Caracas, plans by Dpt. Public Works, Caracas, reconstructing Convent de Nuestra Senora de Las Angles. $200,000.

Venezuela, El Vigia — Republic of Venezuela, Caracas, plans aerodrome. 1,000,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, Higuerete—Republic of Venezuela, Caracas, plans aerodrome. $300,000. Dpt. P. Wks., Caracas, engr.

Venezuela, La Guaira—Municipality, plans sewers, 3,250,000 Bolivars.

Venezuela, Maracaibo—Republic of Venezuela, Caracas, plans aerodrome. 1,200,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, Muracay—Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, veterinary research experimental station, Institute of Agriculture. 10,000,000 Bolivars.

Venezuela, Nuevo Leprocomio—Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, leper colony, 10,000,000 Bolivars.

Venezuela, Polamar — Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, school for 600 students. 900,000 Bolivars.

Venezuela, Rubio — Municipality, plans sewers. 1,370,000 Bolivars.

Venezuela, Rubio—Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, market bldg. $150,000.

Venezuela, San Antonio — Municipality, plans sewers. 530,000 Bolivars.

Venezuela, San Felipe—Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, school for 600 students. 900,000 Bolivars.

Venezuela, Santa Barbara el Zulia—Republic of Venezuela, Caracas, plans wharf. 600,000 Bolivars. Dpt. P. Wks., Caracas, engr.

Venezuela, Tucupita — Republic of Venezuela, Caracas, plans flood protection works. $200,000. Dpt. P. Wks., Caracas, engr.

Venezuela, University City—Republic of Venezuela, Caracas, plans by Dpt. P. Wks., Caracas, exten. urban university. 10,000,000 Bolivars.

Venezuela, Valencia — Republic of Venezuela, Caracas, plans installing electrical sys. 1,900,000 Bolivars. Dpt. P. Wks., Caracas, engr.

PUBLIC BUILDINGS

†**Calif., Barstow**—Pub. Housing Auth., Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, plans by J. Dewey Harnish, 312 East B St., Ontario, 65 portable shelter units, Calif. 4589. CD 1/16—ENR 1/18.

†**Calif., Richmond**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, plans by W. P. Day & H. M. Michelsen, 405 Montgomery St., San Francisco, firesafeing measures for 4 dormitory bldgs., Calif. 4177.

†**Calif., Sausalito**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, plans by W. P. Day & H. M. Michelsen, 405 Montgomery St., San Francisco, firesafeing measures for apartment bldgs., Calif. 4311.

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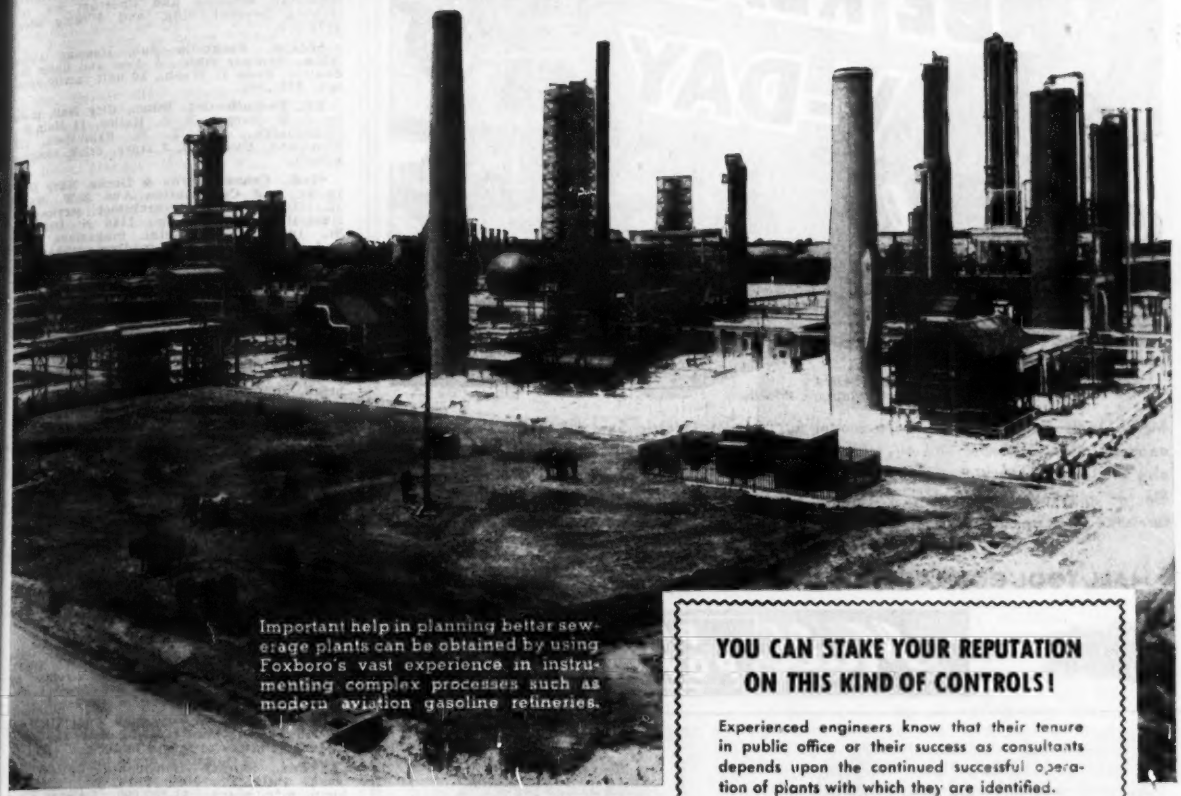

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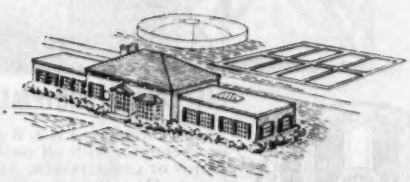

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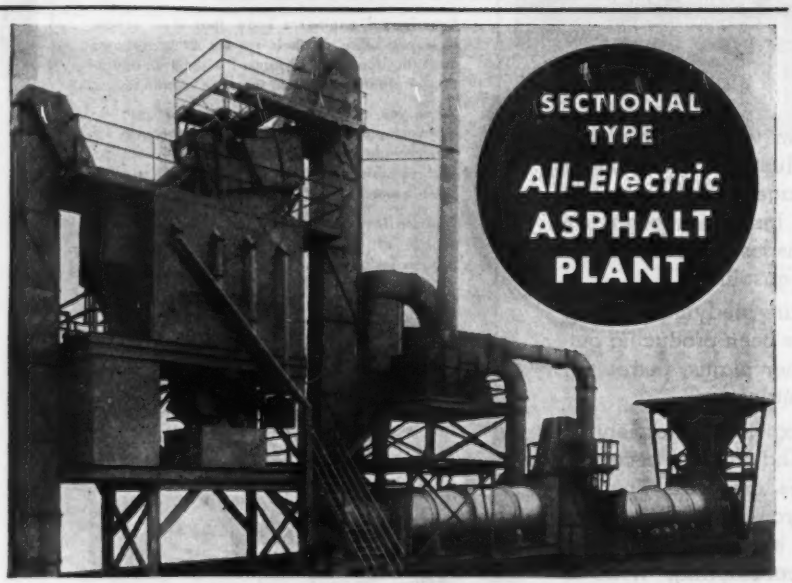

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†Calif., Vallejo—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, plans by W. P. Day & H. M. Michelsen, 405 Montgomery St., San Francisco, firesafeing measures for dormitory at North Dormitory, Calif. 4219.

Del., Wilmington — Wilmington General Hospital, Broome and Chestnut Sts., enlarging present bldg. and 2 wing addn. $175,000.

†Idaho, Pocatello—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, Wash., 80 unit family housing. $250,000.

Ill., DeKalb—Bd. Educ., City Hall, plans by F. E. Berger, R. L. Kelley, 44 Main St., Champaign, and T. E. Samuelson, 139 Elmwood, Evanston, 3 story, brick, concrete school.

†Ind., Crane—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., engineer-architect services by Russell B. Moore Co., 1456 N. Delaware St., Indianapolis, addnl. magazines, lunch and locker bldg. for medium caliber projectile loading plant, Naval Ammunition Depot. CD 1/3.

★**†Md., Suitland**—Federal Works Agency, 18 and F Sts. N.W., Wash. 25, D. C., bids soon Office Bldg. 4. $1,500,000. CD 12/6—ENR 12/14.

Mich., Dearborn—Bd. Educ., City Hall, plans by Jensen & Keough, 15875 James Couzens Hy., Detroit, 2 story, bsmt., steel, brick, concrete school. $150,000.

†Neb., Hastings — Pub. Housing Auth., NHA, 201 N. Wells St., Chicago 6, Ill., 704 unit addnl. dwellings, at Spenser Park housing.

★**†O., Columbus**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, Zone 15, 200 unit family dwellings. $1,160,000.

Ore., Hillsboro—Hillsboro School Bd., City Hall, plans by Annand & Kennedy, engrs.-archts., 401 Central Bldg., Portland, 1 story unit, for David Hill School. $150,000. FWA funds sought.

†Ore., Klamath Falls—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle 1, Wash., 50 unit family housing. $150,000.

†Pa., Phila.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., engineer-architect services by H. A. Kuljian & Co., 1518 Walnut St., boiler plant, Naval Medical Center.

★**†Tex., Houston**—Hughes Tool Co., 100 Hughes St., heat treating shop. $2,500,000. Defense Plant Corp. will finance.

★**†Tex., Sunray**—Continental Carbon Co., 27 Park Pl., New York, N. Y., carbon black mfg. plant. $1,200,000. Defense Plant Corp. will finance.

†Tex., Texarkana—U. S. Eng., 231 W. Main St., Denison, heavy type loading platform at Army Ordnance plant, Ser. 41-242-45-96, over $40,000; concrete vacuum pump houses, rein.-con. barricades, piping, etc., for Army Ordnance Depot area, Ser. 41-242-45-92, over $40,000.

†Va., Fort Belvoir—U. S. Eng., 1 and Douglas Sts. N.W., Wash. 25, D. C., 4 motor repair bldgs. $200,000.

★**†Wash., Bremerton**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, 576 unit dormitory housing. $500,000.

★**†Wash., Seattle**—King County Housing Auth., 4th and Cherry Bldg., Zone 4, plans by Morrison & Jacobsen, 719 2 Ave. Bldg., 256 unit apartments, 1 story frame bldgs. with concrete central heating plant, Director St. and 14 Ave. S., for NHA. $600,000.

†Wash., Seattle—Seattle Housing Auth., 825 Yesler Way, plans by Stuart, Durham & Kirk, 144 one story, frame apartment bldgs., with concrete central heating plant, Michigan Ave. and Corson St., for NHA. $400,000.

†Wash., Tacoma—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, 416 unit dormitory housing. $400,000.

Man., St. James (Postal Dist. Winnipeg)—Municipality, c/o T. B. Findlay, St. James, plans Collegiate on 10 acre site. $150,000.

Man., Winnipeg—Municipality, impry. central concrete mixing plant, $50,000; rebuilding municipal asphalt plant, $50,000; remodelling municipal machine shop, $50,000. W. D. Hurst, City Hall, engr.

N. B., Fredericton—University of New Brunswick, Fredericton, forest ranger school. $150,000.

★**N. B., Saint John**—Dominion Govt., Ottawa, Ont., addnl. immigration and customs bldgs. $1,500,000. National Harbours Bd., Ottawa, Ont., engr.

N. B., Saint John—N. B. Power Coms., Saint John, increasing electric power plant and exten. electricity to rural areas. $300,000.

PUBLIC BLDGS. (Proposed Work, Cont'd.)

Ont., Hamilton—Hamilton Bd. Educ., plans by W. B. Riddell, 510 Imperial Bldg., 16 room school, east end of city. $360,000. CD 11/21—ENR 11/30.

★**Ont., Huntsville**—Municipality, H. E. Rice, mayor, Huntsville, hospital, recreational centre. $500,000.

Que., Quebec City—Dominion Govt., Ottawa, Ont., plans by Dpt. P. Wks., Ottawa, Ont., 3 story bldg. to house offices of Dominion Health and Social Welfare Dpt. and Dpt. Veteran Affairs, on Blvd. des Capucins. $350,000.

★**Que., Quebec City**—Municipality, F. X. Chouinard, city clk., dwellings. $500,000.

Que., Quebec City—Province of Quebec, Quebec City, public building on south side of Grande Allee, opposite present main Legislature Block. $350,000. Dpt. P. Wks., Quebec City, engr.

Sask., Lac la Ronge—Province of Saskatchewan, Regina, fish filleting plant. $40,000. Ministry of Resources, Regina, engr.

BIDS ASKED

Bids Asked January 30

†**Ill., Granite City**—U. S. Eng., 816 U. S. Courthouse & Customhouse, St. Louis 2, Mo., installing automatic sprinkler sys. in Warehouses 1, 2, 3, 4 and 5 and Bldgs. T-332 and T-333, incl. air compressors, control valves, sprinkler heads, excav., masonry, pipe work and electrical work, Neg. 23-065-45-33.

Bids Asked In January

†**Neb., Sidney**—U. S. Eng., 909 17 St., Denver, Colo., concrete paving warehouse floors. $35,000.

Bids Asked February 1

†**Mo., Normandy (St. Louis 21, P. O.)**—St. Vincent's Sanitorium, Sister Margaret, administrator, 7300 St. Charles Rock Rd., Normandy, St. Louis, Zone 1, brick, concrete nurses home, Mo. 23-297N. $173,000. **FWA.** Plans deposit $15. P. M. O'Meara & Associates, 4908 Delmar Blvd., St. Louis, Zone 8, archts.

Bids Asked February 5

Ont., St. Catherines—Dr. G. C. Shaver, supt., c/o Niagara Peninsula Sanatorium, Merritton Hy. and A. E. Nicholson, archt., 46 Queen St., alterations, addns. sanatorium bldgs. $270,000. J. R. Stork, c/o owner, engr. CD 12/3/43—ENR 12/9/43.

Bids Asked February 7

†**N. J., Trenton**—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., community bldg. addn., N.J. 5-3. $20,000. Micklewright & Mountford, 219 E. Hanover St., archt. CD 11/8—ENR 11/16.

Bids Asked February 12

Pa., Ephrata—Boro Manager, Boro Hall, 21 E. Locust St., power house addns., alterations, $400,000, incl. equip. Louis T. Klauder & Assoc., Lincoln-Liberty Bldg., Phila., engrs. CD 9/20—ENR 9/28.

Bids Asked About February 16

†**R. I., Coddington Cove (Newport)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., research bldg. at Naval Torpedo Station Annex. CD 1/16.

Bids Asked February 21

†**Wyo., Laramie**—Bureau of Mines, Dpt. Interior, H. P. Rue, contg. officer, Laramie, 1 and 2 story, 46x180 ft., rein.-con. shale laboratory, $450,000. Plans deposit $50. F. H. Porter, 2118 Central Ave., Cheyenne, archt. CD 10/9—ENR 10/12.

Bids Asked

†**Conn., Southington, Meriden and Shelton**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass. (selected list bidders), altering housing Gale Terrace, Broad Acres and Woodside Heights, Conn. 6161, 6162 and 6171. CD 1/7/44—ENR 1/13/44.

†**Mass., Ludlow**—U. S. Eng., 31 St. James Ave., Boston, (selected list bidders), addnl. housing facilities, No. 19-023-45-NEG 77. $70,000.

LOW BIDDERS

★**Calif., Long Beach**—S. E. Vickers, city mgr., City Hall, Jan. 12, 5,000,000 cu. ft. natural gas storage tank, telescopic, Spec. No. C-444, for City Gas Dpt., City Hall, welded pipe, from Bethlehem Steel Co., E. Slauson Ave., Vernon, **$611,600**; welded and riveted pipe, from Stacy Bros. Gas Constr. Co., 5535 Vine St., Cincinnati, O. **$889,600.** CD 12/14—ENR 12/21.

†**Ill., Dwight**—**Veterans Admin.**, Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Jan. 14, bldgs., addnl. utilities, from J. D. Hedin Constr. Co., 820 Michigan Ave. N.E., Wash., D. C. **$395,000.** CD 12/7—ENR 12/14.

†**Ill., Peoria**—U. S. Dpt. Agriculture, 14 St. and Independence Ave. S.W., Wash. 25, D. C., 2 story, 44 x 65 ft., brick, rein.-con. synthetic liquid fuels semi works bldg., from Coath & Goss, 228 N. La Salle St., Chicago, **$58,913.**

†**N. Y., Greenhaven**—U. S. Eng., 120 Wall St., New York, Zone 5, Jan. 16, recreation bldg. and motor maintenance shop, from John H. Eisele Co., 18 E. 41 St., New York, Zone 17. **$149,300.** CD 1/10—ENR 12/28.

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PUBLIC BUILDINGS (Low Bidders Cont'd.)

†**Va., Fort Myer (sta. Arlington)**—U. S. Eng., 1 and Douglas Sts. N.W., Wash. D. C., Jan. 16, barracks and mess hall at South Post, Neg. 49-080-45-34, from D. Piracci & Co., 2552 Woodbrook Ave, Baltimore, Md. $359,000. CD 1/6—ENR 1/11.

CONTRACTS AWARDED

†**La., New Orleans**—U. S. Eng., 26 St. and Avenue F, Galveston, Tex., neuropsychiatric facilities, based on Alternate A-2, providing for concrete roadway, La Garde General Hospital, Solic. No. 41-243-45-C-47, to Bob Bros. Const. Co., 2400 Cypress St., $33,360. Bids 1/10, awarded 1/12. CD 1/4.

†**Mass., Lowell**—U. S. Eng., 31 St. James Ave., Boston, ordnance bldg., to J. F. Fitzgerald Constr. Co., 214 Essex St., Boston. Est. over $40,000. Charles T. Main, Inc., 201 Devonshire St., Boston, engrs.

†**Mont., Billings**—St. Vincent's Hospital, Billings, 3 story, bsmnt., 110 x 192 ft., rein.-con. nurses home, Mont. 24-114-N, to J. C. Boespflug Constr. Co., Securities Bldg., Seattle 1, Wash. $346,470. FWA. Bids 1/11, CD 1/4—ENR 12/21.

†**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., laundry, Bayonne Annex, Navy Yard, NOY 11237, to Arthur Venneri Co., 259 N. Broad St., Elizabeth, N. J., $49,358. CD 11/6, under Bayonne, N. J.

†**Okla., Pryor**—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Dec. 12, blending towers addns., Serial No. 24-066-45-23, at Oklahoma Ordnance Works, to Ditmars-Dickmann Constr. Co., Muskogee, $66,000. Bids 12/13.

†**Pa., Pittsburgh**—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., site imprvs., incl. addnl. drainage facilities, grading, walks, steps and paved areas, two 10x16 ft., brick bus shelters, watermain, seeding, mulching, planting slopes, at Glen Hazel Heights, Pa. 36101, to Pavia Co., RD, Verona, $222,995. Bids 12/21. CD 12/8.

†**Wash., Tacoma**—Tacoma General Hospital, 315 S. K St., 5 story, 50x172 ft. and 2 story, 40x55 ft., rein.-con., masonry nurse's home addns. Docket 45-387-N, to Macdonald Building Co., 1517 S. Tacoma Way, $365,271. FWA. CD 1/17 under LB—ENR 10/12.

★**Que., Longue Pointe (Montreal)**—Secy. Dpt. Munitions & Supply, Ottawa, Ont., 3 addnl. storage bldgs. at R.C.O.C. Ordnance Depot, to Anglin-Norcross, Quebec, Ltd., 612 Sherbrooke St. W., Montreal, about $1,250,000. Bids 1/12. CD 1/8.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Long Beach—Hilton Hotel Co., 210 E. Ocean Blvd., 160 room hotel addn. Over $150,000.

Ill., Elgin—Sherman Hospital, 934 Sherman St., plans by E. Gylleck, 140 S. Dearborn St., Chicago, 6 story, brick, stone concrete, steel hospital addn. $350,000.

N. J., Nutley—Yantacaw Village, 16 Court St., Brooklyn, N. Y., plans by E. Gerber, 1170 Raymond Blvd., Newark, 5 unit garden apartments, 84 families, Memorial Pkwy. $350,000.

Tex., Houston—Houston Elks Club, 810 Crawford St., plans by Finger & Rustay, Natl. Standard Bldg., altering 4 story, bsmnt., constructing 2 story addn., etc. $150,000.

Tex., Kerrville—Temple Lumber Co., Miller Lumber Co. Assoc., Kerrville, 25 or more dwellings. CD 10/6—ENR 10/12.

N. B., Saint John—Y. M. C. A., Saint John, plans Y. M. C. A. bldg. $450,000.

N. B., Shippigan—H. Robichaud & Elden Jones, c/o Hedard Robichaud, Shediac, theatre. $150,000. Site acquired.

N. S., Halifax—Y. M. C. A., Halifax, plans Y. M. C. A. bldg., Barrington St. $350,000.

N. S., Wolfville—Acadia University, Halifax, student residence. $150,000.

Ont., Cornwall—T. Eaton Co., Ltd., 190 Yonge St., Toronto, department store. $175,000.

Ont., Ottawa—J. J. Lyons, 291 Nelson St., 38 single dwellings. $155,000.

Que., Montreal—Reverend Sisters Consolatrices du Divin Coeur, 7 Belmont St., hostel, Pie IX Blvd. $150,000.

Sask., Saskatoon—Electric Equipment Co., Ltd., 224 E. 20 St., 5 story office, etc. bldg. $150,000.

Sask., Saskatoon—Yaegers Furs Ltd., 39 St. and 3 Ave., store, office, etc. bldg. $150,000.

CONTRACTS AWARDED

N. J., Highland Park—Harper Gardens, 129 E. 124 St., New York, N. Y., two 2 story, brick garden apartments, to Rutgers Homes, Inc., 129 E. 124 St., New York, N. Y., $203,565. L. M. Rothman, 129 E. 124 St., New York, N. Y., archt.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Colo., Pueblo — BUS DEPOT — Denver-Colorado Springs-Pueblo Motor Way, Inc., 1601 17 St., Denver, 1 story, 75x90 ft., 1045 Dahlia St., Denver, stucco on masonry bus depot. $40,000.

Conn., Stamford—FACTORY—Globe Slicing Machine Co., 224 Selleck St., brick facing. L. F. Caprani, 1531 Chapel St., New Haven, engr.

Ill., Chicago — FACTORY — A. Epstein, engr., 2001 W. Pershing Rd., soon lets contract, 1 story, 330x70 ft. factory addn., for Harlich Mfg. Co., 1417 W. Jackson Blvd.

Ill., Chicago—PLANT—Lubin Bros. Paper Co., 730 W. Randolph St., plans by Fox & Fox, 645 W. Randolph St., rebuilding paper plant, 1040 N. Halsted St. $50,000.

N. J., Clifton—MACHINE SHOP, etc.—V. Mazzarisi Co., Inc., 619 Lexington Ave., plans by J. Thomas Camlet, 24 Piaget Ave., 1 story, brick machine shop and warehouse bldg. addn. $40,000.

N. J., Newark — WAREHOUSE — Service Bag & Burlap Co., 914-16 McCarter Highway, 2 or 3 story, brick warehouse. $45,000.

Pa., Derry — FACTORY — Westinghouse Electric & Mfg. Co., Geo. H. Parkman, dir. Bldg. Constr. & Main., Maloney Bldg., Pittsburgh, 1 story, brick factory bldg. alterations. $150,000. L. C. Meckling, Maloney Bldg., Pittsburgh, ch. design engr.

Tex., Edcouch—PLANT—Bob Tankersley Produce Co., 610 W. Kruttschmitt St., Edinburg, 2 story, vegetable and citrus packing plant, brick, rein.-con. $45,000.

★**Tex., Houston**—PLANT—Kelly-Springfield Tire Co., 407 N. Main St., constructing, equipping rubber tire mfg. plant, adjacent to existing synthetic rubber mfg. plant. $6,200,000.

★**Tex., Houston** — REFINERY PLANT — Shell Oil Co., Shell Bldg., exten. refinery plant, at Deere Park. $6,000,000.

Tex., Mission—PLANT—Bordo Products Co., c/o P. Krause, local mgr., Mission, bids soon 1 story, 50x200 ft., brick, rein.-con., and structural clay tile processing plant addn., 415 E. 8th St. CD 2/13—ENR 2/24.

Tex., San Antonio—STORAGE, etc.—Alamo Laundry & Dry Cleaning Co., 526 S. Alamo St., plans by M. G. Simons, 428 Aztec Bldg., 50 x 75 ft. storage vault. $45,000.

Tex., Weslaco—PLANT—Val Verde Packing Co., Weslaco, 2 story citrus and vegetable packing plant, rein.-con., brick, metal, etc. $48,000.

Wash., Cowiche—PLANT—Valley Evaporating Co., G. Hallauer, Cowiche, dehydrating plant. $40,000.

Wash., Longview—PLANT—Weyerhaeuser Timber Co., Longview, pilot plant. $159,293. C. T. Heritage, Longview, engr.

Wis., Algoma—FOUNDRY—Algoma Foundry & Machine Co., Algoma, plans by Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., Green Bay, 1 story, 73x98 ft., steel, brick foundry addn.

Wis., Appleton—FACTORY—W. C. Rehbein Co., 1102 W. Wisconsin Ave., 1 story, 98x106 ft., structural steel factory. R. M. Connelly, P. O. Box 54, engr.

Wis., New London—WAREHOUSE—American Plywood Corp., New London, plans by Oppenhomer & Obel, Green Bay, 1 story, 100x1240 ft. warehouse, 20x60 and 20x44 ft. wings, concrete block, concrete fdn.

Wis., Sturgeon Bay—WAREHOUSE—V. M. Bushman, 216 Main St., Green Bay, plans by Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., Green Bay, 1 story, 76x132 ft. warehouse.

B. C., Vancouver—PLANT—Blaine Myers Fishing & Packing Co. Ltd., 302 Alexander St., processing and canning, etc. plant. $50,000.

★**B. C., Vancouver** — PLANT — British Columbia Sugar Refining Co. Ltd., Rogers St., 100x100 ft. plant. About $675,000.

B. C., Victoria—SAW MILL, etc.—C. & K. Logging Co. Ltd., 211 Pemberton Bldg., Victoria, saw mill, etc.

B. C., Victoria—SAWMILL, etc.—P. W. Sawmills, Ltd., 410 Central Bldg., Vancouver, plans saw mill, shingle mill, box factory. $50,000.

N. B., Shippigan—SERVICE STATION, etc.—Imperial Oil Co. Ltd., Shippigan, service station and garage. $50,000.

Ont., Bowmanville—PLANT—Northumberland & Durham Apple Growers Assn., E. A. Summers, secy., Bowmanville, cold storage plant. $50,000.

Ont., Brighton—PLANT—Northumberland & Durham Apple Growers Assn., E. A. Summers, secy., Bowmanville, cold storage plant. $50,000.

Ont., Cornwall—MACHINE SHOP—Bingley Eng. Ltd., 40 Williams St., machine shop. $40,000.

Ont., Oakville—PLANT—Oakville Tool & Die, Ltd., and General Stampings, Ltd., D. Harrington, pres., Lachine, Que., plant extns., Dundas St. $45,000.

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INDUSTRIAL BUILDINGS (Proposed Work, Cont'd.)

Ont., Ottawa—GARAGE, etc.—A. Johnson, 352 Bell St., garage and repair shop. $40,000.

Ont., Toronto—MINING DEVELOPMENT—Coventry Gold Mines Ltd., c/o M. Aiken, 88 W. Richard St., mining development, essential bldgs. $100,000.

Ont., Toronto—PLANT—Electric Repair & Machine Co. Ltd., c/o A. J. P. Cameron, 372 Bay St., generation, storage, etc. machinery mfg. and repair plant. $40,000.

Ont., Toronto — PLANT — Holland Marsh Syndicate, c/o Dpt. Agriculture, Toronto, cold storage plant. $100,000. Cost to be borne by Dominion Govt. and Provincial Dpt. Agriculture.

Ont., Toronto — FACTORY — Ingraham Clock Co., Ltd., 7 Grand Ave., plans by J. B. Parkin, 96 W. Bloor St., factory exten. $40,000.

Ont., Toronto—FACTORY—Keiner & Co. Canada Ltd., 52 Dickens Ave., plans by W. C. Bauden, 247 Dovercourt Rd., factory. $50,000. CD 12/29—ENR 1/4.

Ont., Toronto—PLANT—Noxzema Chemical Co. of Canada, Ltd., c/o J. Marvin-Shaw, 92 Jarvis St., plant. $50,000.

Ont., Toronto—PLANT—Tait Plate Glass Co., Ltd., c/o J. T. Gow, 139 Glenrose St., plate, sheet and all kinds of glass mfg. plant. $50,000.

Ont., Wiarton—FOUNDRY—R. Barnard, Wiarton, brass foundry. $40,000.

Que., Malartic — MINING— Duomalartic Gold Mines Ltd., Malartic, mining development. $75,000 available. J. M. Cohen, c/o owner, engr.

Que., Quebec City—PLANT—J. E. Livernois, Ltd., St. Jean St., plans by Rousseau & Begin, 1 Ferland St. 2 addnl. stories to wholesale druggists bldg. $75,000.

Que., Quebec City — GARAGE, etc. — Universal Auto Ltd., 32 Crown St., garage and repair shop. $50,000.

Que., Quebec City—SERVICE STATION, etc.—Owner, c/o Rousseau & Begin, archts., 1 Ferland St., 1 story, 40x80 ft. service station, St. Jean St., 4 story, 90x180 ft. garage between Elgin St., St. Stanislas, McWilliam and Angele Sts. $350,000.

Que., Sutton—PLANT—George Shutt, Inc., 7 Mountain St., Granby, textile plant. $150,000.

Sask., Moose Jaw—PLANT—Canadian Bakeries, Ltd., Moose Jaw, reconstructing plant. $40,000.

BIDS ASKED

Bids Asked January 29

N. J., New Brunswick—PLANT—Johnson & Johnson Co., Highway 1, 1 story, brick mfg. plant exten. A. Frank, 2824 Hudson Blvd., Jersey City, engr.

Bids Asked January 30

N. Y., New York—GARAGE—General Theological Seminary, 175-9 Ave., New York, garage. C. L. Calhoun, 101 Park Ave., New York, Zone 17, archt.

Bids Asked In February

Conn., Norwich — FACTORY — Lockwood Greene Engineers, Inc., engr., 10 Rockefeller Plaza, New York, N. Y., brick factory addn., alterations, for U. S. Finishing Co., Greenville. Over $40,000.

Bids Asked

Ill., Forest Park—FACTORY—G. H. Buckley, archt., 664 N. Mchigan Ave., Chicago, 1 and 2 story, 80x120 ft., factory, Hannah and 13 Sts., for Aunt Mid Co., c/o architect.

Ore., Tillamook — MILL, etc. — Aberdeen Plywood Corp., Aberdeen, Wash., peeler mill and mill pond. $125,000. Rudolph Anderson, Hoquiam, Wash., and R. Johnston, Aberdeen, Wash., archts.

Pa., Youngwood — PLANT — Robertshaw Thermostat Co., C. Pahel, plant engr., Youngwood, 1 story, 60x200 ft., steel frame mfg. plant addn. $60,000.

Tex., Houston—PLANT—Southern Warehouse Corp., 4410 Clinton Dr., 140,000 bbl. rice drying plant, steel frame, corrugated iron, metal siding, concrete fdn. $200,000. Finger & Rustay, Natl. Standard Bldg., archts. CD 11/27—ENR 11/30.

LOW BIDDERS

Conn., Stratford — PAINT STORAGE — Chance Vought Div., United Aircraft Corp., 550 Main St., Jan. 16, metalite sys., paint storage bldg., from E. & F Constr. Co., 78-94 Wells St., Bridgeport. $56,750. CD 1/15—ENR 1/18.

Md., Middle River—PLANT—Glenn L. Martin Co., Middle River, altering aircraft bldgs., from Consolidated Engr. Co., 20 E. Franklin St., Baltimore, $249,500. P. E. Tignor, c/o owner, engr. CD 12/19—ENR 12/21.

CONTRACTS AWARDED

Calif., Burbank—FACTORY—General Controls Co., 1320 S. Flower St., 80x300 ft., rein.-con., steel frame factory, to C. D. Bennett, 1226 Isabel St., Glendale, approx. $50,000. CD 1/4—ENR 1/11.

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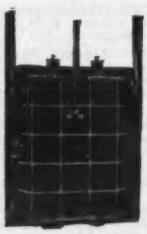

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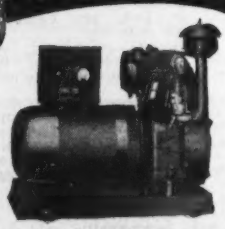

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INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Conn., New Haven—PLANT—General Ice Cream Corp., 110 Bristol St., brick, concrete plant imprvs., alterations, Bristol St., to A. Friederich & Sons Co., 710 Lake Ave., Rochester, N. Y., $40,000. L. P. Caproni, 1221 Chapel St., engr.

Md., Baltimore—PLANT—Koontz Creamery, Inc., 5600 Reisterstown Rd., dairy plant, alterations, addns., to E. Armacost, c/o owner. Est. $82,000.

Minn., St. Paul — FACTORY — Minnesota Box Mfg. Co., E. E. Lennartson, secy., 827 Forest St., general contract rebuilding 1 story, 125 x 192 ft., brick factory, to Lindstrom & Anderson, 1679 University Ave. Est. $45,000.

Mo., St. Louis—FREIGHT DEPOT—St. Louis Southwestern Ry. Co., Cotton Bldg., St. Louis, Zone 2, W. S. Hanley, ch. engr., Tyler, Tex., 2 story, 34 x 250 ft., brick freight depot, concrete fdns. and floors, switching tracks, etc., Lewis St. between Florida and Dickson Sts., Zone 2, to J. S. Alberici Constr. Co., Boatmen's Bank Bldg., Broadway and Olive St., St. Louis, Zone 1. Est. approx. $105,000.

N. J., Bayonne — LABORATORY — Richfield Oil Corp., 261 W. 1 St., 1 story cinder block laboratory, to H. Christensen, 511 South Ave., Westfield. $40,000. CD 1/3—ENR 1/11.

N. J., Guttenberg—FACTORY—Universal Checking Sys., Inc., 225—62 St., West New York, 1 story, concrete block factory, to Majocchi Corp., 6011 Park Ave., West New York, $40,000. J. Weber, 133—70 St., archt.

N. J., Kearny (br. Arlington)—STORAGE—Harry Harris Co., 33 Passaic Ave., 1 story, 100x202 ft., brick, steel storage bldg., to Abel & Howe Co., 53 Jackson Blvd., Chicago, Ill., $50,000.

N. J., Paterson—FACTORY—Bogue Electric Co., 37 Kentucky Ave., 3 story, 65x200 ft., brick, steel mfg. bldg., separate contracts. $45,000. CD 12/11—ENR 12/14.

N. Y., Port Chester—FACTORY—American Vault Co., Midland Ave., brick, steel factory, Midland Ave., to John Lowry, Inc., 61 Vanderbilt Ave., New York, Est. $105,000. F. S. Parker, 533 W. 57 St., New York, archt.

Ore., Astoria — PLANT and PIER EXTENSION—Columbia River Salmon Co., Astoria, 2 frame dwellings, repairing dock facilities, to Gilpin Constr. Co., 4850 N. Front St., Portland, $56,000. Awarded 1/13. CD 1/4—ENR 1/11.

Ore., St. Helens—MILL—Fir-Tex Insulating Board Co., St. Helens, pulpwood cut-up mill, to G. H. Buckler, Lewis Bldg., Portland, $125,000. Associated Engineers, 915 Corbett Bldg., Portland, engrs. Awarded 1/15.

Pa., Pittsburgh—PLANT—National Tube Co., C. R. Cox, exec. vice-pres., Frick Bldg., exten. several structural steel bldgs. to convert rocket line into shell line, to American Bridge Co., Frick Bldg., est. $56,000; munitions and component parts bldg., own forces, $16,000.

R. I., Cranston—FACTORY—Atlantic Tubing & Rubber Co., S. Weinstein, 1 story, 100x120 ft., brick, steel factory, to J. A. Donatelli, 152 Cottage Ave., North Providence, Est. $45,000. CD 11/10—ENR 11/16, under CA.

Tex., Goldthwaite—PLANT—Mills County Locker Corp., Goldthwaite, frozen food locker and processing plant, to M. Horton, Goldthwaite, $40,000. CD 9/26—ENR 9/28.

Tex., Houston—WAREHOUSE—S. Myers, Inc., 600 Lockwood Dr., 1 story, bsmnt., 103 x 190 ft., steel frame, mono concrete warehouse addn., to American Constr. Co., 410 Rusk Bldg., $66,000. CD 1/4—ENR 1/11.

Tex., Junction—PLANT—E. R. Borden, Junction, frozen locker and processing plant, hollow tile, rein.-con., day labor, $40,000. CD 1/11—ENR 1/18.

Tex., Lindale—PLANT, etc.—Lee Dingee, Inc., Lindale, reconstructing vegetable canning plant and warehouse, force account. $40,000. CD 11/10—ENR 11/16.

Tex., Lufkin—PLANT—Lufkin Foundry & Machine Co., Lufkin, imprv. engine assembly plant, foundry and supply bldg., own forces. $90,000. CD 1/13/43—ENR 1/20/43.

Tex., Mercedes—PLANT—C. E. Watson, 101 N. Texas St., Mercedes, 1 story, 110x150 ft., brick, concrete vegetable and poultry packing plant, to E. H. Noser Constr. Co., State Bank Bldg., McAllen, $45,000. CD 1/4—ENR 1/11.

Tex., San Antonio—INDUSTRIAL—Champion Pecan Machine Co., H. A. Wittliff, pres., 401 Augusta St., 2 story, bsmnt., concrete, masonry industrial bldg., to A. P. Rheiner & Son, 409 Insurance Bldg. Weidner & Co., 317 Front Bank Bldg., archt. W. E. Simpson Co., Milam Bldg., structural engr. L. D. Royer, 911 Transit Tower, mechanical engr.

Wis., Cedarburg—FACTORY—Kieckhaefer Corp., Western Ave., 1 and 2 story, 50x75 ft., concrete block and brick factory addn., to Selzer-Ornst Co., 6232 W. State St., Wauwatosa, Zone 13. CD 1/16—ENR 1/18.

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INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Wis., Fox Lake—WAREHOUSE—Central Wisconsin Canneries, Inc., Beaver Dam, 1 story section, 100x124 ft., and 2 story section, 43x48 ft., structural steel warehouse addn., to A. E. Hutter, 600 Madison St., Beaver Dam. A. Kuenzi, 202 N. Water St., Watertown, engr.

Wis., Marinette—FACTORY—M & M Box Co., Marinette, 1 story, 60x100 ft., brick factory addn., to F. Colburn, 2110 Hall Ave. Est. $40,000. D. M. Schoepke, 1529 Elizabeth Ave., archt.

Wis., Milwaukee—GARAGE—Cream City Outdoor Adv. Co., 4550 W. Wisconsin Ave., Zone 8, 1 and 2 story, 60x108 ft., steel truss garage addn. concrete fdn., blocks and floor to Bauer Constr. Co., 3851 N. 100 St., Wauwatosa, Zone 13. R. W. Dwyer, 2577 N. 89 St., Wauwatosa, Zone 13, archt.

Wis., West Milwaukee—MACHINE SHOP—L. Burmeister Co., 3225 W. Burnham St., Zone 4, 1 story, 100x200 ft. machine shop, to Selzer-Ornst Co., 6222 W. State St., Wauwatosa, Zone 13. Geo. Schley & Sons, 2309 E. Glendale Ave., Zone 11, archt.

Ont., Kitchener—PLANT—J. M. Schneider, Ltd., 14 E. Courtland Ave., plant exten. to Ball Bros., 49 E. King St. Est. $75,000. CD 12/22—ENR 12/28.

Ont., Walkerville — PLANT — Dominion Forge & Stamping Co., Ltd., 2430 Seminole St., personnel bldg. and die room, at plant, to Allan Const. Co., Ltd., 44 Wyandotte St. E., about $106,000. CD 1/9—ENR 1/11.

UNCLASSIFIED

PROPOSED WORK

Conn., Middletown—SWIMMING POOL—City Park Dpt., G. Misenti, chn., City Hall, swimming pool. $37,700. Site not selected.

Conn., Torrington—RECREATIONAL FACILITIES—State, Comptroller's Office, State Office Bldg., Hartford, recreational facilities, Paugnut Forest. $25,000.

Illinois—RAILROAD TRACKAGE—Missouri Pacific R.R. Co., F. E. Bates, ch. engr., Missouri Pacific Bldg., St. Louis 3, Mo., 4.93 mi. railroad trackage in Williamson and Franklin Counties from point about 5 mi. north of Johnston City, to connection with tracks serving Mine 9 of Old Ben Coal Corp. $25,000.

Kansas—SERVICE EXTENSIONS—P. R. & W. Elec. Coop. Assoc., Inc., Wamego, service extens., Pottawatomie Co. $50,000.

Mich., Detroit—AIRLINES TERMINAL—American Airlines, Inc., Pennsylvania-Central Airlines Corp., and Transcontinental & Western Airlines, Inc., City Airport, Detroit, terminal bldg. for commercial airlines, at Detroit City Airport. $350,000.

Mo., St. Louis—MEMORIAL COURT—City of St. Louis, M. M. Kinsey, pres. Bd. P. Service, 304 City Hall, 12 and Market Sts., Zone 1, plans completed by E. J. Mackay, Washington University, Forsythe and Skinker Blvds., Zone 5, and bids soon Court of Honor in Memorial Plaza, incl. 37 ft. shaft, grouped in composition with walled in sunken court, in block bounded by Market by Chestnut, 13 and 14. Sts. $45,000.

Okla., Yale—OIL PIPELINE—Johnson Oil Refining Co., Cleveland, 5 mi. 4 in. crude oil pipeline, $40,000.

Texas—RURAL ELECTRIC LINES—Deep East Texas Electric Cooperative, San Augustine, exten. rural electric lines, San Augustine Co. $50,000.

Texas—RURAL ELECTRIC LINES—San Patricio Electric Cooperative, Sinton, exten. rural electric lines, San Patricio Co. $75,000.

Tex., Carthage—GAS LINES—Chicago Corp., c/o Tennessee Gas & Transmission Co., Commerce Bldg., Houston, addnl. gathering gas lines (in connection with supplying gas to main line between South Texas and West Virginia), $100,000.

Tex., Jefferson—PIPELINE—Atlantic Pipe Line Co., City Bank Bldg., Shreveport, La., addnl. oil pipeline facilities, over $40,000.

Tex., Orange — DOCKS — City, replacing municipal docks. $75,000.

Man., Winnipeg — DAMS — Province of Manitoba, c/o Ministry of Mines & Resources, Winnipeg, completing dams in forested areas. $241,000. Water Resources Branch, Dpt. Mines & Resources, Winnipeg, engr.

N. B., Fairhaven—WHARF—Municipality, wharf and floating slip, Deer Island, $30,000.

N. B., Fredericton—PARK—Province of New Brunswick, Fredericton, Provincial Park in St. John County and National Park at location to be decided upon. $200,000. Dpt. P. Wks., Fredericton, engr.

N. S., Halifax—PARK EXTENSION—Municipality, J. Gerald DeWolf, alderman, 182 acre exten. to Fleming Park, fronting on western shore of Northwest Arm and exten. westward across Purcell's Cove. $50,000.

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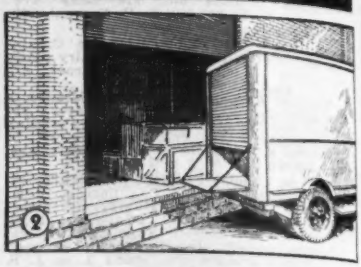

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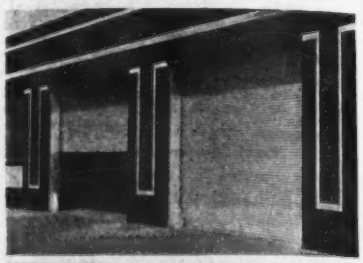

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BIDS ASKED

Bids Asked After January 23

†Tex., Denton—AIRPORT—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, Zone 1, airport. Bids Nov. 2 rejected. CD 11/8—ENR 11/16, under LB.

†Tex., Galveston—RADIO RANGE STATION—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, Zone 1, relocating ML radio range station, Galveston Airport, plans deposit $10. Bids Jan. 12 rejected. CD 1/16—ENR 1/18.

Bids Asked January 30

Illinois—RURAL ELECTRIC LINES—Clay Electric Cooperative, Inc., L. F. Brissenden, pres., Flora, 27.6 mi. rural electric line extens. in Clay Co. Michael Drazen & Associates, 4903 Delmar Blvd., St. Louis 8, Mo., engrs.

Bids Asked

†Tex., Harlingen — GUNNERY RANGE — U. S. Eng., 25 St. and Avenue F, Galveston, air-to-ground gunnery range. Over $25,000. CD 1/9—ENR 1/11.

LOW BIDDERS

†Tex., Georgetown—RUNWAYS, etc.—★U. S. Eng., Fort Sam Huston, Jan. 16, runways, night lighting incl. beacon and equipment vault, Serial W.-41-154-45-54, from Uvalde Const. Co., P. O. Box 3027 and Texas Bithulitic Co., P. O. Box 5297 both of Dallas, combined bid $738,182***Alternate 1, from Brazos Const. Co., P. O. Box 93, Mineral Wells, $630,550***Alternate 2, from Standard Paving Co., 250 Majestic Bldg., Fort Worth, $985,916. CD 1/9.

CONTRACTS AWARDED

†Calif., Hamilton Field—HANGAR—U. S. Eng., 74 New Montgomery St., San Francisco, hangar and lean-to, Job 1775-5, to Peter Kiewit Sons Co. and Haas Constr. Co., 442 Post St., San Francisco, $127,866.

†Calif., Salinas—AIR BASE BLDGS—U. S. Eng., 74 New Montgomery St., San Francisco, increasing housing facilities at Salinas Army Air Base, Job 1925 A, to Howson Bros., Gilroy, $129,500. Bids 1/9.

Conn., Stratford — HANGAR PAINT SPRAY BOOTH — Chance Vought Div., United Aircraft Corp., 550 Main St., hangar paint spray booth, in Hangar 2, Lordship, to Edwin Moss & Son, Inc., 555 Grant St., Bridgeport. Est. $40,000. Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., engrs.

†Md., Piney Point—TEST RANGE IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., imprv. Naval Torpedo Test Range, NOY 11279, to McLean Contg. Corp., Fidelity Bldg., Baltimore.

†Minn., Minneapolis — HANGARS, etc. — U. S. Eng., Post Engineer's Office, 1454th AAF Base Unit, Alaskan Div., ATC, Wold-Chamberlain Airport, general contract altering hangar bldgs., 2 story addns. to south side, to E. M. Ganley Co., 2922 Oakland Ave., $32,480. Bids 1/8.

N. J., Linden—DOCK IMPROVEMENTS—Cities Service Oil Co. Wood Ave., dock repairs, incl. replacement wood bulkheads with 260 ft. steel bulkheads and steel piling, dredging in front of dock, to Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, N. Y. $80,000.

†N. Y., Niagara Falls—NIGHT LIGHTING—U. S. Eng., 120 Wall St., New York, Zone 5, night lighting sys., to Edward Zwicker Corp., 416 Lexington Ave., New York, Zone 17, $36,918. Bids 12/21. CD 12/7—ENR 12/14.

†Okla., Tulsa — FLOOR DRAINS — U. S. Eng., 416 Wright Bldg., Zone 2, constructing floor drains, Serial No. 34-066-45-24 Modification Center 16, to Erbelding Constr. Co., 426 E. 9 St., $27,775.

†Texas—GAS PIPELINES—United Carbon Black Co., Odessa, and United Carbon Bldg., Charleston, W. Va., 93 mi. 8- to 26-in. natural gas pipelines, vicinity of 2 carbon black plants, now under construction, near Odessa, to Smith Contg. Co., Odessa, $215,000. Defense Plant Corp. will finance. CD 1/16—ENR 1/18.

†Utah, Ogden—OPEN STORAGE AREA—U. S. Eng., 1209 8 St., Sacramento 8, Calif., hard surfaced open storage area at UASF, to W. W. Clyde & Co., Springville, $69,607. Bids 1/13.

Wisconsin — TRANSMISSION LINES — Wisconsin Power & Light Co., 122 W. Washington St., Madison, transmission line between Prairie du Sac and Dodgeville, to L. E. Myers Co., 53 W. Jackson Blvd., Chicago, Ill. Est. $415,000. CD 12/5—ENR 12/7.

Wyoming—TRANSMISSION LINES—Carbon Power & Light Co., Saratoga, 56.2 mi. rural transmission lines and sub-stations, Wyo. 21, Carbon Co., to Vance Electric Service, 1603 S. State St., Salt Lake City, Utah, $89,487.

Proposal Advertisements see p. 174 and 188

Postwar Projects see p. 130

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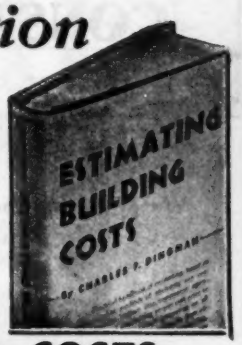

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OFFICIAL PROPOSALS

Bids: Feb. 9 (351)

Water Main Construction

WASHINGTON SUBURBAN SANITARY COMMISSION

CONTRACT NO. 181-W

Sealed proposals for constructing approximately 1,900 feet of 6-inch, 2,680 feet 8-inch and 1,910 feet of 24-inch cast iron water mains, on Contract No. 181-W, will be received at the office of the Washington Suburban Sanitary Commission, Hamilton Street, Hyattsville, Maryland, until 3:00 P.M., Eastern War Time, Friday, February 9, 1945, at which place and time they will be publicly opened and read.

Plans and specifications may be obtained from Harry R. Hall, Chief Engineer of the Commission, Hyattsville, Maryland, upon deposit of $5.00, which deposit will be returned to bidders, or to those returning plans and specifications in good condition.

Perry Boswell
J. Donald Clagett
Frank B. Smith
Commissioners

OFFICIAL PROPOSALS

Bids: Feb. 7 (348)

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS
BUREAU OF CONTRACTS & ACCOUNTS
ALBANY, N. Y.

Sealed proposals will be received by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, Albany, N. Y., on WEDNESDAY, FEBRUARY 7, 1945, for the construction and reconstruction of highway projects in the following Counties:

County	Deposit for plans	Bid deposit	Type	Miles	Priority rating
Albany	$5	$11,000	Bit. Mac. M. M. Opt. 4' Concrete Widening	6.34	.....
Greene	5	5,500	Bit. Mac. M. M. Optional	4.24	.....
Nassau (Cons.)	5	7,000	9" TH. x 33'	0.90	131782 AA. 3
Otsego	5	120	Electrical Work	....	CMP.5 AMRO AA. 1 Ser. No. 133876 AA. 3
St. Lawrence (Cons.)	5	500	Grading & Drainage	2.50	.....

OFFICIAL PROPOSALS

Schenectady	5	8,000	Bit. Mac. M. M. Opt. 3.31

Maps, plans, specifications, and estimates may be obtained at the office of the Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineer in whose district the roads are located. The names and addresses of the District Engineers will be furnished on request and may be seen at the office of the State Department of Public Works, State Office Building, Room 894, Worth & Center Streets, New York City.

The deposit for Plans and Proposal Forms for each contract containing 1 to 15 sheets is $5.00; 16 to 30 sheets, $10.00; over 30 sheets, $20.00. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

Minimum Wage Rate per hour for above work shall be as follows:

County	Skilled Labor	Intermediate Grade Labor	Unskilled Labor
Albany	$.85	$.85	$.85
Greene	.60	.60	.60
Nassau	.87½	.87½	.87½
Otsego	....	....	....
St. Lawrence	.90	.90	.90
Schenectady	.85	.85	.85

UNLESS SHOWN OTHERWISE IN THE ITEMIZED PROPOSAL FOR EACH PROJECT.

The right is reserved to reject any or all bids.

CHAS. H. SELLS,
SUPT. OF PUBLIC WORKS

Bids: March (346)

Supply and Delivery of Shallow Boring Plants

WATER CONSERVATION AND IRRIGATION COMMISSION, N. S. W.

Tenders in envelopes plainly endorsed "Tender for Shallow Boring Plants" and addressed to the Secretary, Water Conservation and Irrigation Commission, Farrer Place (Box 2708, G.P.O.), Sydney, New South Wales, will be received up to 10:30 a.m., on Thursday, 1st March, 1945, for the supply and delivery, free on wharf or free on rails, Sydney, of from one (1) to six (6) Shallow Boring Plants. Copy of Specification may be obtained free of cost at the Commission's Head Office, Farrer Place, Sydney. The lowest or any tender not necessarily accepted. John Messner, Secretary.

(W. C. & I. C. No. 44/8580).

(Continued on page 186)

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